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# **Language Difference and Disorder in Early Sequential Bilingual Children**

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## **Abstract**

This thesis explores the language development of early sequential bilingual (ESB) children. This group speak a language other than English at home (L1) and are introduced to English before the age of five years. Although over 20% of school age children in Australia are ESB, there is limited literature investigating typical language development in this group. This presents a unique challenge for speech-language pathologists (SLPs) working with ESB children. Without a benchmark for typical language development, it is difficult to validly discern atypical development and identify language disorder.

This thesis has a strong clinical focus, providing essential foundations for Australian SLPs in an area where none currently exist. It is divided into three sections, each addressing a key area of clinical knowledge: understanding typical development, identifying disordered development, and intervention. The findings are considered within a dynamic interactive processing framework of language (Kohnert, 2008, 2013) which considers interactions between language and the environment, as well as interactions between language and other cognitive systems within the individual.

Section 1 presents two papers investigating the features of typical L1 and L2 lexical development in Australian ESB children. First, a longitudinal study investigated L1 and L2 lexical development during the initial stages of L2 exposure. Nine Samoan-English ESB children and matched monolingual controls were assessed four times during their first two years at school. Patterns of ESB lexical learning were identified between and within each language. Importantly, this study highlighted composite scoring as a valid methodology for assessing the lexical skills of ESB children.

Data from the longitudinal study revealed a second element of language learning in Samoan-English bilinguals. Receptive and expressive vocabulary tasks evaluated acquisition of four word types: cognates, matched nouns, phrasal nouns and holonyms. Each word type had varying phonological and conceptual difference between Samoan (L1) and English (L2). Results highlighted conceptual distance between L1 and L2 as a key factor in L2 lexical acquisition. The children acquired L2 lexical items earlier if their conceptual representation was similar to that of L1. Words with greater conceptual distance between L1 and L2 (phrasal nouns and holonyms) emerged more slowly. This suggests that L1 influences L2 lexical acquisition in this population.

The second section of this thesis investigates how assessment can validly differentiate language difference from disorder in Australian ESB children. Knowledge of typical ESB language development was used as a means to identify disordered language development. A single case series presented the cases of school age sequentially bilingual children. A range of clinically feasible, culturally sensitive assessment techniques were utilised to achieve valid differential diagnosis. The cases suggest two essential standards for evaluating bilingual language development in an Australian context. First, using techniques other than formal assessments is crucial. Formal assessments can provide useful information in a repeated baseline context but are insufficient for diagnosing language impairment in bilingual children. Second, diagnosis requires the implementation of a range of assessment techniques. Considered together, these provide a strong body of evidence outlining a child's language abilities in their unique cultural context.

A further study is then presented outlining the case of an ESB child with an unusual pattern of language disorder. Peter, whose L1 was Vietnamese, came into regular contact with English (L2) at four years of age. Culturally appropriate assessment at eight years of age revealed intact Vietnamese abilities but significantly impaired English. Assessment highlighted poor lexical development, with underspecified lexical templates and inhibited access to lexical knowledge. Peter's language profile challenges current thinking that language impairment always manifests in both languages of a bilingual child. Possible reasons for the findings are explored with reference to current models of bilingual language. A specific executive functioning deficit could produce difficulty inhibiting L1, which is essential for access to the separately stored L2 lexicon. Such a deficit plausibly accounts for impairment presenting in L2 only.

The third and final section of this thesis investigated whether L2 learning in Australian ESB children could be enhanced by bridging conceptual knowledge between L1 and L2. Year One Samoan-English ESB children participated in the study which targeted learning in their regular classroom mathematics program. A control group received all instruction in English. A second, intervention group received lessons in English and Samoan. The material covered and the amount of instruction was the same for each group. The only difference was in the language of instruction. L2 conceptual learning was measured before and after intervention on two instruments. Initial data from each test in isolation indicated no additional benefit for students who received bilingual intervention. Further analysis revealed two interesting patterns of learning between tests. Firstly, all students more easily acquired rote mathematical skills and knowledge than conceptual knowledge and its associated vocabulary. Secondly, there were

differences in patterns of learning between groups. The control group demonstrated rote mathematical skills but made limited progress acquiring conceptual knowledge. In contrast, the intervention group demonstrated more balanced learning: acquisition of rote mathematics skills were matched by gains in conceptual knowledge. We propose that bilingual intervention facilitated English word learning, producing improved learning of core skills linked to underlying conceptual knowledge.

This thesis considers the language development of ESB children in Australia. While further research is necessary in this important field, the data provide a clinical SLPs with a starting point for considering typical and atypical language development in this population. ESB children do eventually acquire native proficiency in L2, but in a manner that follows neither the timeline or sequence of their monolingual peers. They are, indeed, language different.

## **Declaration by author**

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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## **Publications during candidature**

### **Peer Reviewed Papers**

**Hemsley, G.**, Holm, A. & Dodd, B. (2006). Diverse but not different: the lexical skills of two primary age bilingual groups in comparison to monolingual peers. *International Journal of Bilingualism*, 10(4), 453-476.

**Hemsley, G.**, Holm, A., & Dodd, B. (2010). Patterns in diversity: lexical learning in Samoan-English bilingual children. *International Journal of Speech-Language Pathology*, 12(4), 362-374.

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**Hemsley, G.**, Holm, A., & Dodd, B. (2012). Conceptual distance and word learning: Patterns of acquisition in Samoan-English bilingual children. *Journal of Child Language*, 40(04), 799-820.

**Hemsley, G.**, Holm, A., & Dodd, B. (2013). A bilingual child's language profile: impaired English but intact Vietnamese. *Speech, Language and Hearing*, 16(3), 127-138.

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**Hemsley, G.**, Holm, A., & Dodd, B. (2014). Better in both? Bilingual intervention in an Australian school context. *Australian Journal of Education*, 58(2), 139-152.

### **Additional Publications**

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## Oral Presentations

**Hemsley, G.** Bilingual Master Class: Opening the ESL Can of Worms. *Education Queensland Training and Development Seminars*, Brisbane, September 2006.

**Hemsley, G.** Counting all day: The perils of language disorder for a bilingual child. *The University of Queensland, School of Medicine Post Graduate Conference*, Brisbane, May 2007

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**Hemsley, G.** (June, 2007). Every case different. Queensland Speech Language Pathologists - In Charge Conference, Brisbane.

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## **Keywords**

early sequential bilingualism, language development, language impairment, lexicon, word learning, child, assessment, Samoan, Vietnamese, speech-language pathology

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ANZSRC code: 200408:

Linguistic Structures (including phonology, lexicon, semantics), 40%

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## **Abbreviations**

BICS	Basic interpersonal communication skills
CALP	Cognitive academic language proficiency
CASL	Comprehensive Assessment of Spoken Language (Carrow-Woolfolk, 1999).
CELF-4	Clinical Evaluation of Language Functioning – fourth edition, Australian standardised edition (Semel, Wiig, and Secord, 2006)
DA	Dynamic assessment
ESB	Early sequential bilingual
ESL	English as a second language
HPNT	Hundred Picture Naming Test (Fisher and Glenister, 1992)
L1	First language acquired by a sequential bilingual
L2	Second language acquired by a sequential bilingual
PCCA	Peer child comparative analysis
PLI	Primary language impairment
PVVT-4	Peabody Picture Vocabulary Test – fourth edition (Dunn and Dunn, 2007)
SLI	Specific language impairment
SLP	Speech-language pathologist
TEMA	Test of Early Mathematics Ability
TEs	Translation equivalents
WISC-4	Wechsler Intelligence Scale for Children – fourth edition (Wechsler, 2003)

# Chapter 1

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## Introduction and Literature Review

## **1.1 Background**

The research presented in this thesis grew from my practice as a speech-language pathologist (SLP) in Australian schools with a high proportion of early sequential bilingual (ESB) children. These children learn a language other than English from birth, with regular English exposure beginning at childcare or school. They present a number of challenges for SLPs working in schools.

In this context, one important challenge for Australian SLPs is that most research describing ESB language acquisition has occurred outside Australia. The foundation for understanding early sequential bilingualism comes from research carried out in the United States of America (US), the United Kingdom (UK) and Canada. This research shows that the nature of a child's bilingual environment significantly influences language learning. Differences are therefore evident in first and second language acquisition between countries, and regions within countries (Kohnert, 2013; Thordardottir, 2005). Like their overseas counterparts, Australian ESB children also have a unique language learning context, therefore, SLPs should not assume that their language acquisition patterns will mirror those of ESB children in any other nation.

Nevertheless, key documents used by Australian SLPs and educators rely heavily on overseas research. The ESL Bandscales (McKay, Hudson, & Sapuppo, 1994), for example, is an Australian benchmark document for tracking development and support for students using English as an additional language. Its descriptions of typical second language acquisition and development depend on research completed in the US, and particularly the work of Cummins, whose groundbreaking research has radically influenced educational policy in the US (e.g., Cummins, 1984; Cummins, 1991, 2000). Similarly, findings from overseas (largely North American research) significantly influenced the Speech Pathology Australia (2009) position paper guiding clinical practice with culturally and linguistically diverse clients.

The dominance of overseas research in these key Australian documents is troubling. Professionals supporting bilingual children in Australian schools use these documents to guide clinical practice, producing a real risk of generalising conclusions drawn from US research to ESB children in Australia. While research from other nations provides direction for investigation into patterns of Australian ESB language development, it is unlikely to

provide accurate benchmarks for Australian children or universal patterns for ESB language development (Kohnert, 2013; Paradis, Schneider, & Duncan, 2013; Thordardottir, 2005).

The dearth of Australian research into ESB language development also creates a challenge for assessment. SLPs use a range of assessment techniques to identify typical versus disordered language development. Differential diagnosis with monolinguals is a relatively straightforward process, however, the same task with ESB children is lengthy and complex. While it is possible to describe first and second language abilities, the features of typical versus disordered development remain unclear. There are no definitive criteria available for clinical decision making. Evidence that the language features of typically developing bilingual children echo those of language disorder in monolingual children amplify the diagnostic dilemma (Paradis, 2010; Windsor & Kohnert, 2004).

On a practical level, Australian SLPs have inadequate protocols for valid, culturally appropriate and clinically feasible ESB language assessment. Some bilingual assessment options are culturally inappropriate in Australia. Other assessment methodologies are impractical in an education setting that allocates limited time and funding for assessment and reporting. For example, an SLP might obtain an interpreter for a single session but rarely for long enough to attain the ‘gold standard’ of comprehensive first language evaluation and parent interviews.

My clinical experience suggested that the above challenges lead to errors in diagnosis. Some children whose English language difficulties were attributed to their ESB status in fact had an underlying language impairment. Other children, diagnosed with a primary language impairment (PLI), later showed language development typical in the context of their bilingualism. In summary, misinterpreted data and misidentification of language difficulties affected the reliability and validity of SLP services to these ESB children. This problem is not unique to Australia: the over- and under-identification of ESB language disorder has been reported worldwide (Crutchley, Botting, & Conti-Ramsden, 1997; Donovan & Cross, 2002; Hwa-Froelich & Westby, 2003; Mennen & Stansfield, 2006; Samson & Lesaux, 2009; Stow & Dodd, 2005a; Winter, 1999, 2001).

The questions that arose from my clinical practice and initial reading of the literature motivated a preliminary study evaluating outcomes for ESB children at the end of their primary-school years. The findings from that study raised theoretical and clinical questions



regarding early sequential bilingualism in an Australian context. This thesis addresses these questions.

This chapter explores the relevant literature and introduces a conceptual framework, the Dynamic Interactive Processing perspective (Kohnert, 2008, 2013). The value of this framework in interpreting the findings of this thesis is evaluated in chapter 7.

## **1.2 Defining Early Sequential Bilingualism in an Australian Context**

Being bilingual means different things to different people. Numerous descriptive terms and definitions reflect the academic or philosophical bent of the author, as well as the language learning context being investigated (Hammer, Miccio, & Rodriguez, 2004; Li Wei, 2000; Romaine, 1995). The terminology used in this thesis has been selected to best describe the language environment and patterns of language use within the population studied.

In this thesis, children described as bilingual have the ability to understand and/or use two languages (Brutt-Griffler & Varghese, 2004). These languages can be introduced either simultaneously or sequentially. Simultaneous bilinguals are exposed to two languages from birth. Sequential bilinguals acquire at least minimal competence in one language (L1) before being introduced to the second (L2). The age of L2 introduction varies widely and is a ‘fundamental consideration’ when investigating the language development of bilingual children (Kohnert, 2008).

Delineating early sequential bilinguals from late sequential bilinguals is important. Late sequential bilinguals are introduced to their second language in late childhood or adulthood. Early sequential bilingual (ESB) children are introduced to their second language during the first five years of life, also referred to as the ‘primary language development’ period (Genesee, 1988; Kohnert & Bates, 2002).

Interest in ESB language development has surged over the last two decades with research largely coming from nations with a dominant minority home language. For example, although 19.7% of the US population is bilingual, 62.3% of this group is Spanish-English speaking (Shin & Kominski, 2010). Similar circumstances can be found in other nations. For example, Germany has a high proportion of Turkish-German speakers; Canada, a high proportion of French-English speakers; and England, a high proportion of Punjabi-English speakers (Ebert, Rentmeester-Disher, & Kohnert, 2012). These predominant bilingual

populations have provided a focus for research into ESB language development and assessment techniques in these countries.

In contrast, and as noted earlier, there is a dearth of research with Australian ESB children. This may reflect the nation's astonishing cultural and linguistic diversity. Australia has proportionately more bilingual speakers than the US, with 21% of the population speaking at least one other language at home (Australian Bureau of Statistics, 2006). Unlike countries such as the US and the UK, no single minority language dominates in Australia, with a representation of forty-four language groups (Australian Bureau of Statistics, 2006; Gordon, 2005). Italian, Greek, Cantonese, Arabic, Mandarin and Vietnamese are the six languages most commonly spoken at home (other than English). To complicate the situation further, these six diverse languages and cultures combined represent less than 35% of the total bilingual population (Australian Bureau of Statistics, 2006; McLeod, 2011).

This thesis focuses on Australian ESB children. Compared to nations with a dominant minority language, Australia's 'melting pot' of languages has produced a very different language learning context for its ESB children (Borland, 2006; Clyne, 1991; McLeod, 2011). While all experience another language at home, in contrast to their overseas ESB counterparts, Australian ESB children frequently:

- experience limited community support in L1;
- start school with few, if any peers with a common L1; and
- start school without access to staff with a common L1.

These factors reduce exposure to and support for developing L1. Indirectly, they reduce the value the child places on maintaining L1, commonly resulting in L1 decline (Borland, 2006; Portes & Hao, 2002). This pattern is concerning as L1 maintenance and development following introduction of L2 is a known factor in improving L2 learning and socio-emotional outcomes in sequential bilinguals (Cummins, 1981; Kohnert, Yim, Nett, Kan, & Duran, 2005; Portes & Hao, 2002; Restrepo et al., 2010; Rolstad, Mahoney, & Glass, 2005).

Compared to children in nations with a dominant minority language, L2 learning experiences may also differ for Australian ESB children. English immersion is the primary way that Australian ESB children acquire English at school. This produces a unique challenge for these children, particularly for those without previous regular and consistent English exposure. With monolingual English speaking peers often a minority presence in their

classroom, Australia's ESB children acquire L2 in three ways: through limited interactions with their few monolingual English speaking peers; through interactions with other ESB children with varied, and often limited, English capabilities; and, through interactions within the more formal register of classroom interactions and teacher direction.

### **1.3 A Starting Point: Diverse but not Different: The Lexical Skills of Two Primary Age Bilingual Groups in Comparison to Monolingual Peers**

My frustrations as a clinician working with ESB children resulted in the design and implementation of a research study investigating typical ESB language development in an Australian context (Hemsley, Holm, & Dodd, 2006: see Appendix A). The research investigated the lexical skills of three groups of 11-year-old students from different language backgrounds. The research compared two groups of ESB students to a monolingual control group matched for socio-economic status. The ESB groups had a first language (L1) of Vietnamese or Samoan with English as their second language (L2). Linguistically, these groups were highly diverse, with limited overlap in phonology or lexical structure.

The literature has a strong focus on identifying how long it takes ESB children to develop L2 abilities comparable with their monolingual peers. US research reported that it took six years of L2 exposure to produce L2 dominance (Kohnert & Bates, 2002; Magiste, 1992), resulting in language skills and educational outcomes commensurate with matched monolingual peers (Cummins, 1981; Cummins, 1984; Hakuta, Butler, & Witt, 2000; Ramírez, 1992).

The Australian study (Hemsley, et al., 2006) investigated whether these findings could be replicated in an Australian context. Tasks examined English lexical comprehension and use, as well as single word processing on non-word tasks. The study produced three key findings:

- The two ESB groups' results showed no differences.
- The ESB groups performed significantly below their monolingual peers in all lexical tasks but not on non-word tasks.
- The ESB groups demonstrated incomplete English acquisition even though they were typically developing students achieving pass or higher grades in the classroom.

The following discussion considers the implications of these findings for the theory of bilingual language acquisition, assessment practice and educational policy are considered below.

### **1.3.1 Key Finding 1: Similarities in the Two Bilingual Groups**

The children in the Samoan-English and Vietnamese-English groups in the year six study (Hemsley, et al., 2006) came from vastly different cultural and linguistic backgrounds. It was predicted that such diversity would produce differences in lexical acquisition between groups. This was not the case. Instead, the data identified clear patterns of L2 development across groups. Specifically, the Samoan-English and Vietnamese-English groups demonstrated similar performance on receptive and expressive lexical tasks, as well as on non-word tasks. Thus, for the first time, the literature reported a pattern of common L2 lexical development across language pairs.

The bilingual groups also demonstrated similarity in error patterns across tasks. For example, in the picture name judgement task both bilingual groups had a similar ratio of semantic to phonological errors. Compared to monolingual controls, they produced a significantly greater proportion of phonological errors. For example /T↔nom↔t ʔ/ was frequently accepted as a correct representation of ‘thermometer’, and /αIblαY/ as a correct representation of ‘eyebrow’. This suggested that the bilingual groups more readily accepted inaccurate phonological representations for familiar vocabulary, a finding consistent with that of Windsor and Kohnert (2004) who proposed that less elaborate lexical representations in English affected L2 performance for older bilingual students.

### **1.3.2 Key Finding 2: Differences Between the Monolingual and Bilingual Groups**

Research in the US found that six years of regular exposure to English was sufficient for sequentially bilingual children to perform at the same level on language tasks as their monolingual peers (Collier, 1989; Cummins, 1984; Hakuta, et al., 2000; Kohnert & Bates, 2002; Kohnert, Bates, & Hernandez, 1999; Ramírez, 1992; Windsor & Kohnert, 2004). This was not the case in an Australian language learning context: both bilingual groups performed significantly below monolingual controls on all lexical tasks. The substantial difference in performance between the monolingual and bilingual groups was unexpected. Even in the Hundred Picture Naming Test, a task evaluating lexical access to common objects, the data revealed a highly significant difference for both bilingual groups.

### **1.3.3 Key Finding 3: Incomplete English Acquisition**

The year six study considered the development of typical ESB students. Students included in the study:

- had at least six years of regular, consistent exposure to English at school;
- were reported by their teachers to be performing at pass level or higher in the classroom;
- had no history of learning difficulties or speech therapy support;
- performed within the average range on a cognitive screener;
- had no history of hearing loss; and
- considered English to be their dominant and best language.

Despite these positive indicators, the English lexical abilities of this group fell significantly below the level of their monolingual peers. This result should not be interpreted as evidence of pathology. It does, however, indicate incomplete acquisition of aspects of L2 (Kohnert & Bates, 2002; Nicoladis & Genesee, 1997). In a class setting, their reduced ability to use the language of education would disadvantage these students. Over time, this disadvantage could influence the quality of higher education these ESB children could access in comparison to their monolingual peers (Brutt-Griffler & Varghese, 2004).

### **1.3.4 Theoretical Implications:**

The literature reveals the use of many theoretical perspectives to interpret and explain the complexities of language development and disorder in bilingual children and adults (Kohnert, 2013; Paradis, 2010). These theories are applied and interpreted across a range of disciplines including psychology, linguistics, speech-language pathology, and education. Although these disciplines often share commonalities, each is characterised by different perspective and purpose. Each theoretical perspective has been developed and modified to reflect current thinking and relevant issues pertinent to a specific field of research. For this reason, many theories are linked to each other, or overlap in conceptual foundations.

Kohnert (2008, 2013) challenged the value of considering any single theory in isolation. Following a review of theoretical perspectives currently influencing bilingual research, she suggested that a “clear unifying conceptualization of language is possible as well as necessary... with linguistically diverse populations” (Kohnert, 2013, p. 13). Kohnert proposed

a ‘Dynamic Interactive Processing’ (DIP) perspective that draws on the ideas and principles of five complementary, and sometimes convergent, theoretical classes:

- i. social constructivism – originally developed by Vygotsky (1978), these theories emphasise the collaborative nature of learning through social interactions. They focus on an individual’s language potential (‘learnability’) and the role of motivation (intrinsic and extrinsic) to explore language learning and use.
- ii. interactive processing – identifies the “top-down” and “bottom-up” processing of cognitive, sensory and motor information involved in language acquisition. Interactive processing models investigate the effect of cognitive mechanisms (e.g. perception, memory, attention) and executive function on language as well as the efficiency and speed of processing (see Gillam, Montgomery, & Gillam, 2009; Windsor & Kohnert, 2009).
- iii. functionalism – considers language to be constructed through use and posits that language forms are determined by communicative functions: language is the mapping between form (e.g. phonology, syntax) and function (MacWhinney, 1997). Functionalism underlies competition (e.g., Bates & MacWhinney, 1989), usage-based, and pragmatic-based models.
- iv. connectionism – views the brain as a network of connected neurons where language learning occurs through the recognition of patterns of connections that are then generalised to new situations (e.g., Rumelhart & McClelland, 1986). Connectionism emphasises the role of experience or input to weight the connections activated by stimuli as well as the inherent architecture of the system (see Joanisse, 2009).
- v. dynamic systems theory (DST) – describes language learning as a process of interactions. These occur within language (e.g. between words, sounds, discourse) as well as between social and cognitive systems within the environment of the learner (Herdina & Jessner, 2002). Learning within a bilingual context is well documented within DST, allowing for “interaction of multiple languages, linguistic aspects, and contexts with the different cognitive processes involved” (Restrepo, Morgan, & Smyk, 2011, p. 515). This multiplicity of interactions produces a constant state of unrest and vulnerability within and between sub-systems, with small differences between individuals resulting in significant changes throughout the system (De Bot, Lowie, &

Verspoor, 2007). Because each individual has finite resources with which to work language learning outcomes will also be influenced by internal prioritisation of cognitive resources: “memory capacity is limited, as is the time available to spend on learning, the available knowledge, and the amount of motivation to learn” (De Bot, et al., 2007, p. 12).

Within a DIP framework, Kohnert draws complementary aspects of these five theories together. This has resulted in a holistic definition of language as:

*...a dynamical system that emerges within a social context through interactions of cognitive, neurobiological and environmental systems and subsystems across nested timescales (p.13).*

This definition provides a conceptual framework for exploring the results of the year six study (Hemsley, et al., 2006). Consideration of the tenets of specific theories occurs within the bigger picture of the dynamic interactive processing perspective. Specifically, two types of interactions provide insight into the language acquisition of the groups studied First, interactions between language and the environment, and second, interactions between language and other systems within the individual speaker.

#### **1.3.4.1 Interactions between language and the environment**

The DIP framework emphasises dynamic interaction between language and the environment. Language does not emerge within the individual but through social engagement with a range of communicative partners for a variety of communicative purposes (Kohnert, 2013). In this thesis, the *language learning context* refers to the interplay between language and the environment.

The ESB groups in the year six study presented with L2 lexical abilities significantly below the level of their monolingual peers. In contrast, studies in the US suggest that following six years of English exposure at school, the English abilities of Spanish-English ESB children are commensurate with their monolingual peers (Hakuta, et al., 2000; Kohnert & Bates, 2002; Kohnert, et al., 1999; Windsor & Kohnert, 2004). The difference in English learning outcomes between Australia and the US may reflect differences between the language learning contexts in each country.

Drawing on tenets of dynamic systems theory, Kohnert (2013) explains the significant impact of even small variations in the language learning context:

*First, changes in one variable or subsystem impact all other parts of the system. Due to interactions within and across systems, small variation in starting conditions can result in large differences in behavioural outcomes. Second, because outcomes of ever-present interactions do not lend themselves to exact calculations, change over time (e.g., the acquisition, loss or recovery of one or two languages) cannot be predicted with precision. Here language is considered a complex system, nested within another complex system - the learner, who is in turn nested within another complex system, the environment (p.11).*

Certainly, the language learning context in the US and Australia differ and therefore lend themselves to differences in language learning outcomes. For example, in the Spanish-English US population continued development of L1 following the introduction of L2 is highly supported by the extended family, the community, and in many cases, the education system (Goldstein, 2004). In contrast, Australia has no single dominant minority culture. Many families have limited exposure to L1 outside the home and immediate family. The culture has strong English dominance, often with limited cultural support for L1 maintenance. In this context, the development of L1 remains largely with the family.

Another difference in the language learning environment between the US and Australia is that Hispanic populations have lived in the US for many generations, providing time for American-English to influence the phonological, grammatical and lexical nature of Hispanic Spanish. The Hispanic language is now described as “a pidgin, a Creole language, an inter-language, or an anglicized Spanish dialect” (Ardilla, 2005, p. 60).

The DIP perspective identifies the importance of the language learning context for ESB language development. Certainly, differences in the language learning context plausibly explain differences in English learning outcomes between Australia and the US. However, Kohnert’s framework does not elaborate on, explain or predict what aspects of the language learning context might be more influential than others. The year six study suggested that some aspects of the language learning context may be less relevant to English learning outcomes. For example, the year six study produced unexpected similarities in English lexical profiles for two highly culturally and linguistically diverse groups: Vietnamese-English and Samoan-English. This may reflect similarities in the English language learning context for each group. For example, both groups:

- had a language other than English spoken at home;



- commenced English exposure at child care or school;
- interacted with English exposure primarily in an educational setting;
- had at least six years of consistent English exposure; and
- attended the same schools in the same geographic and socio-economic area.

For the participants in the year six study, these similarities in the language learning context produced similar English lexical outcomes following six years of regular, consistent exposure to English at school. The finding suggests that the nature and structure of L1 may not be as influential as the language learning context in determining L2 learning outcomes. A replication of the year six study in the United Kingdom (with a range of language pairs) found the same pattern of results (Perry, 2010).

Feasibly, studies of ESB children in other countries from diverse language pairs but in a similar language learning context would also exhibit these patterns. It is essential that future research critically evaluates current findings and trends in the literature across a range of language pairs and language learning contexts. Research in Australia and other nations will enable a more complete understanding of factors affecting ESB development and ensure evidence based practice in this important area.

#### **1.3.4.2 Interactions between language and the individual**

The DIP framework also takes into account interactions between language and the individual. In the bilingual child, L1 and L2 do not operate discretely but interact with each other as well as other cognitive systems. These cognitive systems include memory, attention, perception, processing speed and efficiency (Kohnert, 2013).

Consideration of these interactions brings additional perspective to the findings of the year six study. For example, although the ESB groups performed below their monolingual peers in lexical tasks, there was no difference between groups on non-word tasks. Non-word tasks (auditory lexical decision, non-word repetition and auditory discrimination of non-words) were included in the assessment battery to evaluate the integrity of perceptual systems supporting the lexical system. If the ESB groups found these tasks difficult, differences in lexical performance might be attributable to difficulties perceiving relevant features of the speech signal (Chiat, 2000). The results confirmed that interactions with the perceptual system could not account for lexical differences between groups.

Nevertheless, other cognitive systems may have contributed to the incomplete L2 acquisition of the typically developing ESB children in the year six study. That is, different priorities and needs *within* L1, L2 and cognitive systems as well as interactions *between* them may have affected lexical learning and processing. Kohnert suggested that an increase in processing demands can stress the integrity of the bilingual language system (Kohnert, 2004). For example, an increased pace or complexity of linguistic input can have an adverse impact on accuracy and efficiency in L2 processing. Similarly, time pressure may decrease the efficiency and effectiveness of the language system. This may have been the case in the year six study where time pressure appeared to significantly compromise the accuracy and speed of word retrieval for high frequency, common items on the Hundred Picture Naming Test (Fisher & Glenister, 1992).

Kohnert (2004) noted that “the pattern of breakdown that occurs when we stress the system gives us valuable information about the extent to which the knowledge is robust or automatic” (p.70). In the year six study, stressing the ESB language system with a range of challenging lexical tasks highlighted incomplete L2 acquisition. Although these students were performing adequately in the classroom, it is probable that a lack of robustness in L2 affected their academic performance. In this context, ‘trade-offs’ in processing may be necessary for ESB children to keep up with the academic demands, pace and linguistic complexity of classroom interactions. This would leave them with reduced resources for language learning, thereby extending the L2 acquisition process. Toribio (2004) described these trade-offs in terms of language economy: a reduced lexicon and simplification of language input enables bilingual learners to reduce “processing costs while enjoying the richness of bilingualism” (p.52).

#### **1.4 Research Questions**

The results of the year six study fit well within the conceptual framework of the DIP perspective. The L2 learning outcomes were not attributable to any single factor. Rather, they were the product of interactions between several dynamic systems within and outside the learner (Kohnert, 2008, 2013). These included the L1 and L2 lexicons as well as other general cognitive processing mechanisms nested within an Australian language learning context.

The DIP perspective holds promise as a conceptual framework for considering bilingual language. Kohnert (2013) described a conceptual framework as “a set of broad ideas and

principles taken from relevant research fields that is then used to develop awareness or understanding or to guide activities in a particular area”. From a clinical perspective, the DIP framework requires further evaluation to determine its ability to guide the core business of speech pathologists: assessment and intervention. This thesis, therefore, addresses three questions to explore the relevance of the theoretical concepts of the DIP in a clinical context. These questions respond to the three key findings of the year six study:

- i. What are the features of typical L1 and L2 lexical development in Australian ESB children?
- ii. How can assessment validly differentiate language difference from disorder in Australian ESB children?
- iii. Can targeted intervention enhance L2 learning for Australian ESB children?

These questions formed the catalyst for the studies in this thesis. They divided the thesis into three sections. Each section is consistent with DIP perspective that “views language in context, interacting both with other subsystems within the individual as well as with the environment” (Kohnert, 2013, p. 17).

## **1.5 Section One:**

### **What are the Features of Typical L1 and L2 Lexical Development in Australian ESB Children?**

#### **1.5.1 Typical ESB Development**

Knowledge regarding typical ESB language acquisition remains limited. A wide range of factors appear to influence the quality and rate of linguistic development of both languages across different language learning contexts. Studies across nations, languages and cultures indicate that these factors have a significant impact on language outcomes and hinder conclusions regarding the population as a whole (Leseman, 2000; Rydland, Grover, & Lawrence, 2014; Wong Fillmore, 1991). Mueller, Gathercole and Thomas (2009) suggested five primary factors for considering bilingual language development, all of which are salient to this thesis:

- the age of L2 introduction;

- the cultural or linguistic differences in populations studied (e.g., linguistic similarities/disparities between the two languages being acquired);
- the dominance relationship between the two languages in the community (whether one language is the language of power and/or opportunity in the community);
- the amount and nature of exposure to each language at home and school; and
- the child's/speaker's socio-economic status.

Studies investigating L1 development following introduction of L2 highlight the strong influence of the language learning context. Some studies show that with the introduction of L2, L1 either remains constant or declines (Kan & Kohnert, 2005; Lambert, 1975; Leseman, 2000; Wong Fillmore, 1991). Other studies show equal growth of L1 and L2 (Rodríguez, Díaz, Duran, & Espinosa, 1995; Winsler, Díaz, Espinosa, & Rodríguez, 1999).

Conclusions regarding L2 acquisition also vary according to the language learning context. Time is a significant factor, even in environments where the language learning context is highly conducive to L2 acquisition. For example, a Belgian study evaluated ESB development in children from a high socio-economic area, where L2 (Dutch) was introduced at or before two years of age. Although French was the primary language spoken at home, parents of participants also spoke Dutch and the larger community highly valued fluency in both languages. Despite these encouraging factors, after three years in a Dutch speaking nursery school, ESB French-Dutch children maintained “significant deviation” from monolingual Dutch peers in their understanding and use of Dutch (Schaerlaekens, Zink, & Verheyden, 1995).

Research in other countries also suggests that timelines for L2 acquisition varies according to the language learning context (Rydland, et al., 2014). In the US, with strong support for Spanish-English acquisition, ESB children in some contexts have shown rapid L2 acquisition, allowing them to reach the language level of monolingual peers in as little as five years (Hakuta, et al., 2000; Ramírez, 1992). The bulk of research, however, indicates a longer timeline. While ESB children can develop conversational proficiency (comparable to English monolingual peers) in approximately two years, they require 6-10 years of English exposure before they perform at the same level as monolingual peers in academic tasks (Cummins, 1981; Cummins, 1984; Hakuta, et al., 2000).

Generalising findings from North America and Europe to an Australian context is challenging. As described above, the language learning context of research participants in these

countries/areas is often very different to that of ESB children in Australia. Because of the wide range of factors influencing ESB language development, assumptions regarding the sequence of L2 development and time taken to acquire proficiency are tenuous at best. Further research into which factors are more important or influential in diverse language learning contexts is vital.

### **1.5.2 The Influence of Language Pair**

The literature shows that bilingual children in different countries, with different language pairs and different language learning contexts, have different language learning experiences. The literature says far less regarding bilingual children in the same country with different language pairs but similar language learning contexts. For example, consider a primary school classroom with ten different cultures and language pairs represented. Many of these children will be ESB. Despite their differences in language background and culture, these children present with striking similarities in their language learning context. The pattern and type of L1 and L2 exposure are often identical: a language other than English is used at home by the family, with additional L1 access via television, interactions with extended family and, often, L1 community groups (such as playgroups, church or sport teams). Regular and consistent exposure to English begins outside the home, usually at childcare or school.

In this common Australian scenario, many of the factors influencing bilingual language learning are equal: age of L2 introduction; the dominance relationship between L1 and L2 in the community; the amount and nature of exposure to L1 at home and school; and socioeconomic status. The primary difference between these ESB children is the language pair. This provides a unique opportunity to investigate whether linguistic similarities and disparities between the two languages being acquired affect L2 acquisition and learning.

Research suggests that the language pair being learned can influence ESB language acquisition. For example, L1 can influence L2 development in the areas of phonology (Holm, Ozanne, & Dodd, 1997; Zhu Hua & Dodd, 2006) and grammar (Serratrice, Sorace, & Paoli, 2004; Yip & Matthews, 2000; Zwanziger, Allen, & Genesee, 2005). In contrast, the Australian year 6 study found no differences in lexical development between two culturally and linguistically diverse groups (Hemsley, et al., 2006). A further Australian study did not identify cross-linguistic influence in the area of morphological development (Nicholls, Eadie, & Reilly, 2011): three years old, multilingual children from a single geographic area

demonstrated similar patterns in the acquisition of English morphemes despite coming from diverse cultures and language pairs (with 31 languages represented in addition to English).

These contrasting findings suggest that the influence of the language pair on language development may differ according to the language domain being evaluated (e.g. phonology, grammar, morphology or the lexicon). Further research into cross-linguistic influence in an Australian context is vital for the development of a greater understanding of the mechanisms affecting the various aspects of language acquisition. Research reported in this thesis investigated the effect of language pair on lexical acquisition.

### **1.5.3 A Focus on Lexical Development**

Widely differing forms and functions between languages complicate research into phonology, morphology and grammar. In contrast, comparing and measuring the lexicons of two languages is easier and may explain why lexical development is a primary focus of bilingual research. To date, research with school age children has focused heavily on evaluating L2 acquisition because educators are keen to understand how bilingual children master the language of instruction and learning at school (Cummins, 1981; Cummins, 1984; Cummins, 1991; Hakuta, et al., 2000; Portmann-Tselikas, 2000; Ramírez, 1992; Valdéz, 2004).

While investigation of L2 acquisition is important, it ignores “the totality of the bilingual’s abilities, especially the knowledge specific to the untested language” (Pearson, Fernández, & Oller, 1993, p. 95). Cross-linguistic evaluation provides a more global measure of language skills (Armon-Lotem, 2014; Kohnert & Windsor, 2004). In particular, an assessment technique known as composite (or conceptual) scoring has been helpful in describing acquisition of words across two languages. Developed by Pearson et al. (1993), the technique involves assessing a child in both L1 and L2. Rather than evaluating each language in isolation, the technique calculates a child’s overall semantic composition by counting the total number of lexical items correctly identified or labelled across the two languages. Of particular benefit, this composite scoring has identified a number of typical patterns in bilingual lexical development. For example:

- Children exhibit differences in vocabulary between their languages. Some words are known in both languages (translation equivalents or TEs). Others are known in only one language (singlets) (e.g., David & Li, 2005; Marchman & Martinez-Sussmann, 2002;

Pearson, 1998; Peña, Bedore, & Zlatic-Giunta, 2002). Peña et al. (2002) used a category naming task to investigate lexical-semantic skills in children described as speaking “predominantly Spanish” or “predominantly English”. They found that children generated a similar number of items when completing the task in each language but produced different lexical items in each language.

- Composite scoring produces a much higher number of lexicalized concepts than scores in either language alone (David & Li, 2005; Kohnert, et al., 2005; Marchman & Martinez-Sussmann, 2002; Pearson, 1998; Pearson, et al., 1993; Peña, et al., 2002).
- Bilingual composite scores are comparable to monolingual scores on the same task (Bedore, Peña, García, & Cortez, 2005; Pearson, et al., 1993).
- Children show changing patterns in singlet and TE development over time. In the initial stages of L2 introduction, they use a higher proportion of singlets. Children do not attempt to build vocabulary by looking for L1 translations. Rather, they focus on adding new items to both the L1 and L2 lexicons. As exposure to English increases so do TEs, with children learning to represent lexical concepts in both L1 and L2. This produces a corresponding decrease in singlets (Kan & Kohnert, 2005; Marchman & Martinez-Sussmann, 2002; Pearson, et al., 1993; Peña, et al., 2002).

These consistent patterns of development have strong clinical significance. In particular, composite scoring provides clinical SLPs with a potentially valid tool to differentiate typical lexical development from lexical disorder in bilingual children (Bedore, et al., 2005; Pearson, et al., 1993). Unfortunately, the available evidence remains small, largely limited to Spanish-English bilingual children. Further research with diverse language pairs in a range of language learning contexts is essential to validate the clinical use of this methodology with ESB children.

#### **1.5.4 Aims and Hypotheses in Section One:**

##### **What are the features of typical L1 and L2 lexical development in Australian ESB children?**

Two studies were conducted in response to this research question. Chapter 2 describes a longitudinal study of typical lexical development in Samoan-English ESB children during their first two years at school (initial mean age 4;9 years). Consistent with the principles of

the DIP framework, changes in and interaction between both the L1 and L2 lexical systems were investigated over this period of significant environmental change. The study included receptive and expressive lexical tasks. Based on research into other language pairs, it was hypothesised that:

- i. Both languages would show growth over the study period.
- ii. L2 growth would be greater than L1 growth over the study period.
- iii. Receptive vocabulary would show faster growth than expressive vocabulary.
- iv. Bilingual L2 (English) abilities would be well below monolingual English peers.
- v. Using composite scoring, ESB lexical abilities would be comparable to monolingual peers.
- vi. Singlets would decrease over time, with a corresponding increase in translation equivalents.

A second study (reported in chapter 3) also drew on the longitudinal data used above but the lens shifted to investigate a different aspect of the DIP framework: interaction of systems *within* the learner during the first two years of years of regular, consistent exposure to English at school. Cross-linguistic interactions between L1, L2 and the conceptual system were explored. Specifically, this study examined whether existing conceptual knowledge (which is not language specific) influenced word learning in L2. Previous research suggested that existing knowledge could facilitate or inhibit L2 acquisition (Carroll & Von Stutterheim, 1993; Gaskell & Dumay, 2003; Kellerman, 1995; Lindsay & Gaskell, 2010), however, this had not been demonstrated with children in a natural language learning environment.

Receptive and expressive lexical tasks in this study evaluated acquisition of four word types: cognates, matched nouns, phrasal nouns, and holonyms. Each word type had varying phonological and conceptual difference between Samoan (L1) and English (L2). It was hypothesised that:

- vii. L2 words with conceptual and phonological similarity to L1 would be acquired earlier.
- viii. L2 words with conceptual and/or phonological differences to L1 would be acquired later.



## **1.6 Section Two:**

### **How Can Assessment Validly Differentiate Language Difference from Disorder in Australian ESB Children?**

#### **1.6.1 Language Difference Versus Disorder**

ESB language learning highlights Grosjean's (1982) oft quoted maxim that bilinguals are not two monolinguals in one. Once a second language is introduced, development of L1 and L2 follow different timelines and sequencing to monolingual speakers of either language.

Typical developmental patterns or features of ESB children can appear unusual and at times disordered in comparison to monolingual peers (Goldstein, 2004; Kohnert & Bates, 2002; Windsor & Kohnert, 2004). This different trajectory of language development is frequently referred to as 'language difference' (Langdon, 1989).

Language difference describes a typical pathway to developing bilingual competence. Like monolingual language learners, typically developing ESB children are able to "effectively... take advantage of input in the environment to develop efficient language, on par with other children who have similar language experiences" (Windsor & Kohnert, 2004, p. 878).

Section 1 of this thesis deals with language difference, with a view to describing typical language development in Australian ESB children. Section 2 of this thesis deals with the process of assessing ESB children in a way that allows valid discrimination between language difference and language disorder. In this context, ESB children with language disorder learn language less efficiently or effectively than their peers: a core language deficit exists in the absence of physical, sensory and cognitive impairment (Kamhi, 1998).

SLPs diagnose the presence or absence of language disorder in children. The breadth and depth of past research provides internationally accepted, explicit guidelines and protocols for diagnosis with monolingual populations. Discriminating language difference from genuine language disorder in ESB children is a much more complicated and less explored process. The literature suggests different approaches for assessment and diagnosis but reveals inconsistencies regarding diagnostic standards. Vastly different inclusion criteria in recent investigations of ESB children with PLI reflect these inconsistencies. For example, Cleave, Girolametto, Chen, & Johnson (2010) identified PLI in bilingual children who demonstrated:

- non-verbal cognitive abilities within the average range;

- absence of oral motor problems, neurological problems, or socio-emotional difficulties;
- scores at least one standard deviation below the mean on two standardised English language assessments;
- scores at least one standard deviation below the mean on a mean length of utterance (in morphemes) taken from a language sample; and
- parental concern and parental report of delay in L1.

While several data points were collected to ensure correct diagnosis, the authors conceded that the use of English normative data was a questionable means of identifying disorder in the target population. In stark contrast, Tsybina & Eriks-Brophy (2010) used no direct SLP assessments to confirm the presence of language impairment. Instead, they used parent report of vocabulary size in L1 and L2 as a diagnostic tool, in combination with:

- parental concern regarding language development in L1 and L2;
- uneventful medical history and normal hearing;
- no signs of developmental delay or autism; and
- typical development in daily living and motor skills.

This lack of cohesion in diagnostic criteria needs to be addressed. The development of a gold standard for differential diagnosis of PLI in ESB children would have benefits for practitioners in clinical decision making as well as for researchers conducting studies in the field (Dollaghan & Horner, 2011). Without such protocols, ongoing errors in diagnosis (both under- and over-diagnosis) can be expected to continue (Donovan & Cross, 2002; Hwa-Froelich & Matsuo, 2005; Stow & Dodd, 2005b; Winter, 2001).

In a review of studies concerning assessment practices, Bedore and Peña (2008) argued that two factors contribute to poor diagnostic outcomes for bilingual children:

*First, although fluctuation in children's language skills as a function of use and exposure to two languages has been documented, there is limited normative data about the trajectory of early sequential bilingual language acquisition. Second, language assessment tools currently available are not appropriate for identification of LI in bilinguals because data on clinical markers (i.e. language*

*behaviours that reliably differentiate children with and without LI) that may function for bilingual children are only beginning to emerge (p.1-2).*

While Bedore and Peña's first point is accurate, the absence of normative data is difficult to address because of the lack of homogeneity within the ESB population. As discussed earlier (see section one), several problems are associated with the concept of normative data with ESB children. While local data can be collected in areas with high minority populations from a single cultural background (e.g., Spanish-English in the US), normative data is less plausible when collected in highly multicultural contexts. Despite this, research across cultures and contexts is starting to suggest patterns of typical language difference. These patterns provide a starting point for considering typical ESB development for children with different levels of exposure to two languages (Goldstein, 2004; Kohnert & Bates, 2002; Langdon, 1989; Windsor & Kohnert, 2004).

Bedore and Peña also agreed that differential diagnosis of language difference versus disorder is difficult because of poor assessment options. A number of excellent discussions on assessment options and their limitations confirm this problem (e.g., De Lamo White & Jin, 2011; Fredman, 2006; Girolametto & Cleave, 2010; Kohnert, 2008). Of note, a recent meta-analysis evaluating the diagnostic accuracy of measures intended to identify primary language impairment in bilingual children confirmed that no measure stands alone as an optimal method for identifying language difference versus disorder (Dollaghan & Horner, 2011).

Finally, Bedore and Peña identified an absence of clear clinical markers as the underlying difficulty across ESB assessment options. This concept of clinical markers has great potential for changing the way researchers and practitioners consider ESB language assessment in the future. Establishing clinical markers could result in clearer processes and protocols for differential diagnosis of ESB language disorder. For now, however, clinicians working with ESB students on a daily basis must select from a number of flawed assessment options.

#### **1.6.1.1 Formal assessments**

Formal, standardised tests are a typical starting point for monolingual language assessment. These tests are only valid when the child matches the cultural and linguistic experiences of the standardisation group (Gutiérrez-Clellen & Simon-Cereijido, 2009). ESB children generally bear little similarity to the standardisation sample. Even after several years of consistent exposure to L2, their limited and different experiences using English mean their

language is not comparable to monolingual same age peers (Battle, 2002; Kohnert, Windsor, & Ebert, 2009; Laing & Kamhi, 2003).

For this reason, formal assessments are universally accepted as diagnostically inadequate and inappropriate for differentiation of language difference from disorder (Caesar & Kohler, 2007; De Lamo White & Jin, 2011). Subsequently, professional guidelines advise against their use in a number of countries (American Speech-Language Hearing Association, 2004; Fredman, 2006; Royal College of Speech and Language Therapists, 2006; Speech Pathology Australia, 2009).

### **1.6.1.2 Alternative assessment techniques**

The difficulties associated with formal assessments have led to the rise of a range of unique alternative assessment options for ESB children. These methodologies show promise for differentiating language difference from disorder:

- i. **Peer-child comparative analysis (PCCA)** compares the language skills of a child suspected of language disorder with the language skills of a family member or ‘typically developing’ peer from the same cultural and linguistic background (Terrell, Arensberg, & Rosa, 1992; Thomas & Hand, 2004; Wyatt, 2001).
- ii. **Composite scoring**, discussed above, investigates cross-linguistic lexical development (David & Li, 2005; Kan & Kohnert, 2005; Marchman & Martinez-Sussmann, 2002; Pearson, et al., 1993; Peña, et al., 2002). Composite scores have the added potential of being comparable to monolingual scores (Pearson, et al., 1993).
- iii. **Dynamic Assessment (DA)** evaluates a child’s language learning potential (e.g. Gillam, Peña, & Miller, 1999; Gutiérrez-Clellen, 2000; Gutiérrez-Clellen & Peña, 2001; Hasson, Camilleri, Jones, Smith, & Dodd, 2013; Hasson & Joffe, 2007). Two diagnostic measures produced during the ‘test-teach-retest’ format of DA have particular value for SLPs working with ESB students. First, changes in baseline data provide an indicator of a student’s ability to learn and apply new skills and strategies in a discrete area of language learning (Gillam, et al., 1999; Gutiérrez-Clellen & Peña, 2001; Kapantzoglou, Restrepo, & Thompson, 2012). Second, measures of student behaviours (obtained during teaching) are highly predictive of language impairment in students (Peña et al., 2006; Peña, Reséndiz, & Gillam, 2007; Ukrainetz, Harpell, Walsh, & Coyle, 2000).

None of these assessment techniques, used in isolation, provides a picture of a child's overall language abilities. They do, however, add to a picture of difference or disorder. Further research is required to identify which assessments, in combination, can be used diagnostically.

### **1.6.2 Other Challenges Associated with ESB Assessment**

From a clinical perspective, the challenges of distinguishing between language difference and disorder lie beyond those argued by Bedore and Peña (2008). Additional challenges for SLPs working with this 'uniquely challenging population' (Ebert, et al., 2012) include 1) a lack of SLP training and confidence using alternative assessment techniques; 2) clinical feasibility of assessment techniques; and 3) a lack of data relating to children who do not present with typical patterns of difference or disorder. These challenges must be faced. The development of effective assessment protocols, within these constraints, is essential for the equitable treatment of ESB children in an Australian context.

#### **1.6.2.1 SLP training and confidence**

SLPs require the skills to assess children from a wide range of cultural and linguistic backgrounds. Unfortunately, the majority of SLPs report that they lack the theoretical knowledge and training to provide appropriate assessment services to this population (Caesar & Kohler, 2007; Papoutsis Kritikos, 2003; Williams & McLeod, 2012). Subsequently, clinicians generally lack the confidence to make sound clinical judgements regarding language difference versus disorder (Caesar & Kohler, 2007; Crutchley, et al., 1997; Winter, 2001). Following a survey of SLPs in the USA, Caesar and Kohler concluded that, "school based SLPs ...lack either the knowledge and experience or a clear methodological mandate as to how to proceed with the assessment of bilingual children" (2007, p. 198).

The consequences are twofold. First, limited training and experience mean that many SLPs feel "neither competent nor confident" in the administration of alternative assessment techniques (Caesar & Kohler, 2007, p. 191). The resulting reticence to use alternative assessments produces a second, flow on effect: namely, SLPs continue to rely on formal assessments when assessing ESB children (Caesar & Kohler, 2007; Williams & McLeod, 2012). This is possibly because formal assessments are available, familiar, and able to produce a range of L2 data to identify skills and weaknesses across a range of language areas.

### **1.6.2.2 Clinical feasibility**

Practical factors also need consideration in the assessment of ESB children. First, most clinicians are monolingual (Caesar & Kohler, 2007; Jordaan, 2008; Williams & McLeod, 2012). Assessment of both languages of a bilingual child requires interpreters who can assist with the assessment process. Unfortunately, for both practical and fiscal reasons, access to and choice of interpreters is often limited. Those available can have different levels of education and different levels of experience working with children, two factors that can greatly influence the assessment process. In fortuitous situations, where the SLP speaks both of a child's languages, assessments available in the child's first language, if any, are often limited.

Second, in a world where time is money, assessments are often allocated a set time for completion. This limits the time available to coordinate interviews and assessments with an interpreter. It also limits the option of considering lengthy assessment approaches and techniques. For example, the socio-cultural approach (Cheng, 1997; De Lamo White & Jin, 2011; Martin, 2009) advocates that valid assessment of culturally and linguistically diverse children requires:

- extensive review of documentation and interviews with parents, carers, teachers and relevant others;
- observation of the child with a variety of people across a range of contexts (e.g. at home, in the classroom, with friends); and
- testing all languages the child speaks using formal and informal assessments as well as alternative assessments such as dynamic assessment.

While this approach is comprehensive and may reduce diagnostic error, it is also “an intensive, time-consuming and costly procedure. It will often involve employing bilingual coworkers/translators in order to be undertaken properly” (De Lamo White & Jin, 2011, p. 623). In government departments with tight budgets and time restrictions, this idealistic approach is not feasible.

### **1.6.2.3 Assumptions regarding patterns of language disorder in bilinguals**

Current research into ESB language difference and disorder focuses on population groups. This important work seeks to find patterns of typical development as well as possible markers of disorder. While group studies provide valuable information, they can also result in

assumptions that all members of a group will present in a certain way. This can result in researchers missing less common patterns of development or disorder.

Detailed single case studies can test the assumptions of group findings and provide direction for future research: “Generally, group studies are informative with respect to the similarities that children learning two languages exhibit and may help to pinpoint some potential differences. Detailed case studies help in furthering understanding of potential sources of difference when these emerge” (Bedore & Peña, 2008, p. 9).

This thesis applied single case methodology to directly challenge a major assumption in bilingual literature that has grown from the findings of group studies. Currently the literature asserts that diagnosis of bilingual PLI requires evidence of disorder in *both* L1 and L2 (Gutiérrez-Clellen & Simon-Cerejido, 2009; Kohnert, 2010). No previous reports record PLI in just one of a bilingual child’s languages. Despite this, there are several reasons to question the assumption that such a case would never occur. The manifestation of PLI can vary greatly across languages. In a review of the evidence surrounding bilingual children with language impairment, Kohnert (2010) concluded, “just as the degree of relative proficiency or ability in each language may vary within typically developing bilingual children ...we can anticipate differences in relative L1 and L2 abilities for dual-language learners with PLI” (p. 462). The assumption that language disorder manifests in both languages can never be challenged without considering the criteria for determining an acceptable degree of ‘relative proficiency’.

Differences in language proficiency between a bilingual’s languages have also been suggested in other domains of speech and language research. Research into bilinguals who stutter indicates that both languages are commonly but not always affected (Van Borsel, Maes, & Foulon, 2001). The type and frequency of stuttering can vary widely across languages. Bilingual aphasia literature has also reported cases where aphasia is only evident in one of a bilingual’s two languages: disorder type and severity can vary across languages (Aglioti, Beltramello, Girardi, & Fabbro, 1996; Fabbro, 2001).

Research describing differences in language proficiency between a bilingual’s languages suggest damage to sectors of the brain associated with executive function rather than damage to dedicated language centres (Fabbro, 2001; Green, 2005; Kroll, Sumutka, & Schwartz, 2005; Lorenzen & Murray, 2008). Executive functioning processes, including memory, attention and inhibitory processes, are essential for modulating competing information between L1 and L2. However, little exploration of the impact of these processes on ESB

language acquisition and use has occurred. Future research should consider this issue using group studies in conjunction with detailed case studies. The latter are essential to test assumptions driven by large group findings and to add qualitative evidence regarding variations in atypical ESB language acquisition.

### **1.6.3 Aims and Hypotheses in Section Two:**

#### **How can assessment validly differentiate language difference from disorder in Australian ESB children?**

The second research question generated two studies. In chapter 4 a single case series examines the process of differentiating language difference from language disorder in ESB children. This study reflects five principles suggested by Kohnert (2013) to guide the assessment and diagnosis of bilingual children. These principles are consistent with the DIP perspective of language:

- identify and reduce sources of bias;
- individualise the timing of assessment;
- consider L1 and L2 abilities and needs;
- look beyond language and language dominance; and
- gather data using multiple sources and multiple measures.

Clinical feasibility was also a primary consideration, that is, identification of realistic techniques for clinicians with limited time and resources for individual assessment. It was hypothesised that:

- i. Formal assessments provide limited information when differentiating language difference from language disorder in ESB children.
- ii. No single alternative assessment technique, considered in isolation, can validly differentiate language difference from disorder in ESB children.
- iii. Data from a battery of alternative assessment techniques, considered together, provide useful information for the differentiation of language difference from language disorder in ESB children.



The literature currently states that language impairment always manifests in both languages of a bilingual child (Gutiérrez-Clellen & Simon-Cereijido, 2009; Kohnert, 2010). The single case study presented in chapter 5 challenges this assumption. Analysis of this important case was grounded in a DIP framework of language, with a strong focus on interactions between internal systems: the separately stored L1 and L2 lexical systems, the conceptual system, and the role of a set of cognitive systems responsible for executive function. Interactions between these complex systems were discussed with reference to the revised hierarchical model of bilingual processing (Costa, 2005; Kroll, et al., 2005). Two hypotheses were explored:

- i. It is possible for ESB children to have a lexical disorder in L2 but not in L1.
- ii. A specific executive functioning deficit could produce difficulties inhibiting L1 (which is essential for access to the separately stored L2 lexicon) resulting in impairment in L2 only.

### **1.7 Section Three:**

#### **Can Targeted Intervention Enhance L2 Learning for Australian ESB Children?**

##### **1.7.1 Bridging the Language Gap**

Most ESB children have no language impairment. The introduction of a second language does not cause or exacerbate language disorder (Williams & McLeod, 2012). Despite this, ESB children face challenges in an academic setting (Hemsley, et al., 2006). Classroom learning is affected by different language experiences and distribution of linguistic knowledge across two languages. Subsequently, ESB children may find it difficult to relate to L2 language and literature as a meaningful tool for obtaining and sharing knowledge in the classroom (Portmann-Tselikas, 2000).

The process of acquiring ‘monolingual like’ L2 abilities is reported to take ESB children many years. Studies of children in the US found that they acquired conversational skills at the level of monolingual peers after approximately two years of L2 exposure. However, it took considerably longer to learn sufficient English to perform at the same level in academic tasks (Cummins, 1981; Cummins, 1984; Cummins, 2000; Hakuta, et al., 2000; Ramírez, 1992).

The language ‘gap’ between ESB children and their monolingual peers in the classroom means that ESB children “face some of the same academic and social challenges as do

monolingual children with language impairment” (Windsor & Kohnert, 2004, p. 878). Educators are well aware of these challenges. Considerable research exists into the pedagogy of educating bilingual children in an attempt to identify best practices for enhancing curriculum learning.

L1 knowledge and maturity is a significant factor influencing L2 learning (Lindsay & Gaskell, 2010). An increasing body of evidence suggests that children with a strong L1 have better L2 learning outcomes (Kohnert, et al., 2005; Restrepo, et al., 2010; Rolstad, et al., 2005; Thordardottir, 2010; Tsybina & Eriks-Brophy, 2010). Time spent using L1 does not impede L2 language or academic development. In fact, promoting L1 development can significantly improve L2 language abilities and academic results as well as socio-emotional outcomes (Cummins, 1981, 2000; Kohnert, 2008; Portes & Hao, 2002). For this reason, bilingual education programs that provide education in both L1 and L2 generally produce better L2 outcomes.

A meta-analysis of 17 studies into the effectiveness of bilingual versus all-English educational approaches for English language learners concluded that bilingual education is “superior to English only approaches in increasing measures of students’ academic achievement in English and the native language” (Rolstad, et al., 2005, p. 590). Similarly, a review of 16 studies evaluating bilingual versus English only reading instruction strongly favoured bilingual approaches (Slavin & Cheung, 2003).

### **1.7.2 Application in an Australian Context**

While bilingual language programs are well established in the US, Canada and Europe, their application in an Australian context is more challenging. Bilingual programs have been developed in remote communities where a common indigenous language is shared. In contrast, implementation of bilingual programs in more populated areas, where schools are culturally and linguistically diverse, are limited (Hones, 2005). Cultural clusters exist that could allow implementation of bilingual educational approaches. Unfortunately, no cost-benefit analysis of bilingual education has occurred in this context, even where bilingual staff members are available. Consequently, three factors remain unexplored:

- whether students would benefit from a bilingual program;
- how such a program would be presented; and

- how much bilingual input would be necessary to improve learning outcomes for ESB children.

With no empirical evidence to support claims to the contrary, Australian schools tend to operate on an implicit assumption that immersion in English is the only feasible option for producing good L2 learning outcomes. Often first language abilities are disregarded as irrelevant, albeit in an attempt to help ESB children ‘catch up’ to their monolingual peers (Clarkson, 2007).

The assumption that English immersion is the most feasible means for Australian ESB children to acquire English at school needs critical examination. Superior outcomes produced by bilingual education approaches in other countries should not be ignored. Schools with large numbers of ESB children from one cultural background would be a logical place to trial bilingual educational approaches in an Australian context. Research into the value of such approaches, applying “the wisdom of doing rigorous trials to avert the considerable waste of governments’ and families’ resources” (Wake et al., 2011, p. 4) is a necessary first step.

### **1.7.3 Aims and Hypotheses in Section Three:**

#### **Can targeted intervention enhance L2 learning for Australian ESB children?**

Chapter 6 explores whether changes to the language learning context might improve L2 learning outcomes for Australian ESB children. As ESB children generally begin regular, consistent exposure to English in an educational context, embedding intervention into the curriculum was a logical step. A group study evaluated bilingual versus monolingual (English) instruction in the key learning area of mathematics. This study contrasts with many existing bilingual intervention studies that have not linked intervention to educational programs (e.g., Tsybina & Eriks-Brophy, 2010; Ulanoff & Pucci, 1999).

Nine typically developing Samoan-English students received maths lessons in Samoan and English. A control group of Samoan-English students received all lessons in English. The material covered and the amount of instruction was the same for each group with the language of instruction the only difference. Although the difference between groups was relatively minor, the DIP perspective advocates that even small variations in the language learning context can have a considerable impact on language learning outcomes (Kohnert, 2013). As this change constituted introduction of an educational component to L1 input, the potential impact was significant. It was hypothesised that:

- i. Children would use their knowledge of L1 vocabulary and concepts as a bridge to learn the same vocabulary and concepts in L2.
- ii. Consolidation of knowledge across languages would produce better English learning outcomes for ESB children compared to ESB children receiving instruction in English alone.

## **1.8 Summary**

This thesis responds to the findings of a study of ESB language learning outcomes in Australian children (Hemsley, et al., 2006: see Appendix 1). It explores the lexical development of primary school aged ESB children in Australian language learning context. It targets three key areas of clinical knowledge: understanding typical development, identifying disordered development, and intervention. Because of its scope, this thesis achieves its goal of providing essential foundations for Australian clinicians in an area where none currently exist. The theoretical and clinical outcomes of this work may provide a springboard for future work with the growing population of ESB children in Australian schools.

# SECTION ONE:

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WHAT ARE THE FEATURES OF  
TYPICAL L1 AND L2  
LEXICAL DEVELOPMENT IN  
AUSTRALIAN ESB CHILDREN?

# Chapter 2

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## Patterns in diversity: Lexical learning in Samoan-English bilingual children

Hemsley, G., Holm, A., & Dodd, B. (2010). Patterns in diversity: lexical learning in Samoan-English bilingual children. *International Journal of Speech-Language Pathology*, 12(4), 362-374.

## **Preface**

The findings of the year six study (Hemsley, Holm & Dodd, 2006: see Appendix 1) led to further investigation of lexical development in typically developing ESB children. Chapter 2 presents a longitudinal study that investigated L1 and L2 lexical development in Samoan-English, a language pair rarely studied. Nine ESB children and matched monolingual controls were assessed on four occasions during their first two years at school. Language use information obtained from the families of ESB participants identified that the children had passive patterns of L1 acquisition.

Specially designed tools were used to assess receptive and expressive lexical development in L1 and L2. Lexical size across both languages was determined using composite scoring methodology. Lexical composition was also evaluated through identification of L1 versus L2 singlets and translation equivalents (TEs). Analysis identified clear patterns of lexical development for ESB children in this language learning context.

## Patterns in diversity: Lexical learning in Samoan-English bilingual children

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### Abstract

This study examined the lexical development of nine Samoan-English bilingual children during their first year in English speaking preschools in Australia. Receptive and expressive lexicon in Samoan and English was assessed when the children had completed their first term of school (approximately 10 weeks) and then 6 months later. The bilingual children's scores in each language and composite scores were examined over time. Performance was also compared with typically developing, age-matched (4–5-year-old) monolingual English-speaking peers. Results indicated that the group made significant gains in both languages over time. The bilingual children's receptive composite scores were comparable to monolingual English scores, with clear changes in lexical composition (singlets and translation equivalents) over time. Expressive composite scores of bilingual children were lower than scores of monolingual peers. Results appeared to be highly influenced by the language environment and patterns of language use in this group. The potential use of composite score methodology as a clinical assessment tool in bilingual children is discussed.

**Keywords:** *Bilingualism, language acquisition, assessment, vocabulary.*

### Introduction

Bilingualism refers to the ability to understand and/or speak two languages (Brutt-Griffler & Varghese, 2004). Sequential bilingualism is a commonly discussed bilingual experience, referring to acquisition of at least minimal competence in one language (L1) before exposure to the second (L2). Early sequential bilingualism (ESB) specifically refers to the introduction of the second language within a child's first 5 years (Genesee, 1988; Kohnert & Bates, 2002). ESB children usually experience one language at home, even though a different language is the dominant language of the community. Contact with L2 occurs via older siblings, neighbours, media, community experience and, later, through childcare or school.

ESB is attracting increasing research attention; however, knowledge regarding patterns of language acquisition remains limited (Kan & Kohnert, 2005). This is partially due to the diverse nature of this population. The quality and rate of bilingual linguistic development of both languages in different contexts appears to be influenced by a wide range of factors including: age of L2 introduction (theories of critical periods of acquisition); cultural or linguistic differences in populations studied (e.g., linguistic similarities/disparities between the two languages

being acquired); the dominance relationship between the two languages in the community (and whether one language is the language of power and/or opportunity in the community); the amount and nature of exposure to each language at home and school; and socio-economic status (for an excellent exploration of some of these factors see Mueller Gathercole & Thomas, 2009). Cross cultural studies indicate that these factors greatly impact ESB language outcomes and hinder conclusions regarding the population as a whole (Leseman, 2000; Wong Fillmore, 1991).

An example of this diversity is highlighted in studies investigating the effect of L2 introduction on L1 language development. Some studies show that when L2 is introduced, L1 status remains constant or declines (Kan & Kohnert, 2005; Lambert, 1975; Leseman, 2000; Wong Fillmore, 1991). Other studies show equal growth of L1 and L2 (Rodríguez, Diaz, Duran & Espinosa, 1995; Winsler, Diaz, Espinosa & Rodríguez, 1999).

Conclusions regarding the time taken to attain L2 competency are also varied. A study of Belgian children found that after 3 years in a Dutch speaking nursery school, sequential French-Dutch bilingual children showed "significant deviation" from monolingual Dutch peers in their understanding and use



of Dutch (Schaerlaekens, Zink & Verheyden, 1995). Although progress in L2 acquisition over time was significant, lexical proficiency at age 5 was comparable to 3-year-old monolingual students beginning nursery school. Similarly, a study of older Vietnamese-English and Samoan-English children in Australia found that following six years in an English schooling environment, receptive and expressive English skills remained significantly lower than monolingual peers (Hemsley, Holm & Dodd, 2006). In particular, scores on expressive tasks were two standard deviations below those of monolingual peers. The converse is found in other contexts. For example, Spanish-English speaking children in the USA have, in some contexts, shown rapid L2 acquisition, allowing them to reach the language level of monolingual peers in as little as five years (Hakuta, Butler & Witt, 2000; Ramírez, 1992).

#### *Finding common ground: Describing language difference*

These divergent findings make it difficult to draw conclusions regarding typical ESB language acquisition. Despite this, some common ground has been found, with developmental patterns that appear unusual when compared with monolingual children in either language (Goldstein, 2004). This different trajectory of language development is referred to as “language difference” (Langdon, 1989). There have been three approaches to the description of ESB language difference: evaluation in L2 only; cross-linguistic assessment in L1 and L2; and holistic (or composite) assessment of the linguistic system across language boundaries. It is interesting to note that the vast majority of research for all three approaches is limited to investigation of lexical knowledge rather than other aspects of language competence (such as grammatical ability). This is perhaps because lexical development is relatively easy to measure and compare across languages. It also has been found to significantly correlate to grammatical development in monolingual language development (Kan & Kohnert, 2005).

Investigation of L2 alone is of particular interest to educators who need to understand how bilingual children master the language of instruction and learning at school. While this is important, it does ignore “the totality of the bilingual’s abilities, especially the knowledge specific to the untested language” (Pearson, Fernández & Oller, 1993, p. 95). Cross-linguistic evaluation of language provides a more global measure of language skills (Kohnert, 2004). Tests are administered in L1 and L2 to obtain an overall picture of language development. When language skills are similar across languages, proficiency is said to be “balanced”. More commonly, children tend to demonstrate a strength, or dominance, in one language (Kohnert & Bates, 2002; Magiste, 1992).

While cross-linguistic testing is a thorough approach to assessment, application in a clinical setting

is challenging. Tests that are available in languages other than English are generally normed on monolingual speakers. As noted above, ESB children acquire language differently to monolingual peers in either language. It is therefore clearly invalid to compare bilingual children to monolingual norms in L1 or L2 (Goldstein, 2004; Hemsley, Holm, & Dodd, 2006; Marchman & Martinez-Sussman, 2002; Pearson et al., 1993).

Although cross-linguistic assessment is better than single language evaluation, “the resulting cross-linguistic profile may fail to capture the full extent of children’s lexical-semantic skills” (Kan & Kohnert, 2005, p. 375). This is because bilingual children learn and add new words to two lexicons. Words can be represented in both L1 and L2. These are known as translation equivalents (TEs). Words unique to either one language or the other are referred to as singlets. The mix of TEs and singlets in a bilingual child’s vocabulary produces two lexicons of comparable size but often very different composition (Peña, Bedore, & Zlatić-Giunta, 2002).

In an attempt to amalgamate skills across languages, a third assessment approach known as composite (or conceptual) scoring was developed by Pearson et al. (1993) for the purpose of lexical-semantic evaluation. Composite scoring involves assessing a child in both L1 and L2, but rather than evaluating each language in isolation, overall semantic composition is calculated by counting the total number of lexical items correctly identified or labelled across the two languages. That is, it includes all correct lexical items in one language as well as the singlets of the other language.

Several studies have used composite scoring to evaluate language acquisition in simultaneous bilingual children exposed to two languages from a young age (e.g., David & Li, 2005; Marchman & Martinez-Sussman, 2002; Pearson, 1998; Peña et al., 2002). These have used a range of formal assessment tasks or parent reporting to determine composite scores. Such studies highlight “the potential importance of instruments that productively integrate vocabulary skills in both languages” (Marchman & Martinez-Sussman, 2002, p. 994). For example, Peña et al. (2002) used an expressive category naming task to investigate lexical-semantic skills in children described as speaking “predominantly Spanish” or “predominantly English”. Children generated a similar number of items when completing the task in each language, but the lexical items produced in each language were different. The children consistently produced more singlets than TEs. The resulting composite score reported a much higher number of lexicalized concepts, than scores in either language alone.

One study has used composite methodology with ESB children. Kan and Kohnert (2005) reported composite receptive and expressive vocabulary scores for sequentially bilingual Hmong- (L1) and

English- (L2) speaking children. Consistent with findings by Peña et al. (2002), composite scores were always greater than individual languages scores. The proportion of singlets was greater in younger children with less exposure to L2. TEs were more prominent in older children. This study showed the benefit of composite scoring to accurately capture the bilingual lexical-semantic system.

#### *Using composite methodology to distinguish language difference from disorder*

Some progress has been made in describing language difference in ESB children. Less attention has been given to the complicated process of separating *language difference* (a normal and common pathway towards bilingual competency) from *language disorder* (where there is an underlying problem with the language learning system that would have been evident if the child had been monolingual or bilingual). This differentiation has important clinical significance. In particular, educators and speech-language pathologists lack consistent processes and procedures for accurate identification of language disorder. The result is both under- and over-diagnosis of language impairment in the bilingual population (Donovan & Cross, 2002; Hwa-Froelich & Matsuo, 2005; Stow & Dodd, 2005; Winter, 2001).

Composite scoring has been identified as one potential tool to validly differentiate bilingual language difference from disorder. In their seminal research into composite methodology, Pearson et al.'s (1993) motive was to develop a technique allowing accurate identification of lexical delay in bilingual babies and toddlers. They compared the expressive vocabulary of simultaneous Spanish-English bilingual children to a matched monolingual group longitudinally. Using composite methodology the bilingual and monolingual children scored similarly. Although the need for further research was emphasized, Pearson and colleagues concluded that "current norms and guidelines for identifying delay should be adequate for bilinguals – provided the bilinguals' performance in two languages is taken into account" (Pearson et al., 1993, p. 117). It is surprising that no research has explored this finding in other population groups, given its significant clinical implications for differentiation of language difference from disorder in the bilingual population.

Bedore, Peña, García and Cortez (2005) administered a range of semantic tasks to four groups of children with varying degrees of English and Spanish exposure. Composite scores were calculated differently to other studies (to reflect a novel test approach) but again reported scores for predominantly English and predominantly Spanish speaking children as being comparable to those of more balanced bilingual Spanish-English children. They supported Pearson et al.'s (1993) suggestion that

composite scores have a role in diagnostic decision making that may "result in reduced misclassification of TD (typically developing) children" (Bedore et al., 2005, p. 196).

The literature reviewed suggests that there are pros and cons to each of the approaches to the description of ESB language difference (assessment of L2 only; cross-linguistic assessment of L1 and L2; and composite assessment of the whole linguistic system) and that each might serve a different purpose. For the clinical diagnostic purpose of identifying language disorder, composite assessment has significant value. However, the available evidence regarding composite assessment remains small and limited to Spanish-English bilingual children. Consequently, the aim of the current study was to use a composite scoring assessment process with a different language-pair population to further examine the applicability of the technique.

#### *Research questions*

The study reported in this paper describes lexical development in bilingual children from a little-studied cultural background. Samoan-English bilingual children were selected as they have large and increasing immigrant communities in Australia, New Zealand and the USA. Many Samoans migrate each year, drawn by family, educational or commercial opportunities.

Investigating L1 and L2 development in a different cultural group also has advantages for the wider research community. The diversity of sequential bilingualism makes it difficult to draw conclusions regarding patterns of "typical" language acquisition in this population (Kan & Kohnert, 2005). It is only with further research into different cultures and language environments that common patterns of language difference in sequential bilingualism will become clear.

Data was collected at a time of significant change for the children in this study, who were from predominantly Samoan-speaking homes. Their first year at school marked a significant increase in regular English exposure. L1 and L2 were examined twice within a 6 month period to capture the development and impact of English vocabulary development. Collection of lexical data in both languages also allowed calculation of the composite vocabulary. Analysis of the nature of the total lexical system in addition to each language in isolation was therefore possible.

The inclusion of an English-speaking monolingual group added a further dimension to this study: comparison of monolingual and bilingual lexical scores. Unfortunately, it was not feasible to collect monolingual Samoan data for this study. Previous research has used this approach comparing monolingual and bilingual lexical scores to evaluate the use of composite scoring as a potential tool for

distinguishing language difference from disorder in culturally diverse population groups (Bedore et al., 2005; Pearson et al., 1993).

The following questions were asked:

- How do Samoan-English ESB children develop L1 and L2 during their first year of formal schooling?
- Does composite scoring more accurately describe Samoan-English vocabulary development than assessment in either language?
- Does calculation of singlets in each language and translation equivalents across languages provide useful information regarding lexical development in this group?
- Does composite scoring methodology have potential as a clinical tool for speech-language pathologists to assess lexical development in ESB children?

It was hypothesized that:

- Samoan and English lexicons will be different in composition and size over time.
- English only scores in this group will be well below monolingual peers.
- Composite scoring will provide a more valid measure of lexical skills and growth.
- While both languages will develop over the study period, the marked increase in English exposure should result in larger growth of L2 in relation to L1. The anticipated development of L2 should result in a corresponding increase in words represented across both languages (translation equivalents) over time.

## Method

### *Sociolinguistic background of the study population*

The authors have classified the children in this study as ESB. However, this term is itself variable. Prominent researchers define sequential bilingualism differently, tailoring descriptions to reflect sociolinguistic factors within the population being studied. Description of the language environment and patterns of language use within the study group is therefore essential (Romaine, 1995; Hammer, Miccio, & Rodriguez, 2004).

The children involved in the study live within a highly multicultural area of Brisbane. Samoan, Vietnamese and Indigenous families predominate, with monolingual English families being in the minority. The presence of Samoan within the community is also strong, with access to the Samoan language outside the home available through sporting groups, church, social activities, playgroups and medical services.

The families in the study reported that Samoan was the predominant language heard in the home

from birth to 2 years of age. However, all parents of children included in the study were able to understand and use English at least conversationally. This is largely due to the strong historical influence of the English language on Samoan. Since the arrival of missionaries in Samoa during the nineteenth century the increase in Samoan vocabulary based on English words has been dramatic. There are many word derivations and cognates (Hunkin, 1988). Considerable exposure is also obtained at school, with English being the dominant language of education (Encyclopedia of the Nations, 2008).

### *Participants*

The data presented is part of an ongoing study investigating language acquisition in ESB children. Eighteen 4-year-old children were recruited from three state preschools, a non-compulsory program for children in the year before formal schooling. The children attended the program 2.5 days a week. The program largely consisted of play-based learning. As all teachers were monolingual English speakers, all child-teacher interactions were in English. A state preschool English immersion policy meant that the bilingual children were not provided with formal English instruction during this time.

The children attending the preschools selected for this research were culturally and linguistically diverse. Most of the children in each preschool class were bilingual with a number of different language pairs represented. Approximately a third of the children in each of the three preschools were from Samoan families. Monolingual English-speaking children were a minority in these classes. English was the language of education in this context, although class teachers noted that peers from similar cultural and linguistic backgrounds would interact using both L1 and L2 during play.

Nine Samoan-English bilingual children eligible for participation were identified by their preschool teachers. Children were only eligible if Samoan was the primary language heard in the home from birth to 2 years of age. None of the children had previously attended child-care or other kindergarten facilities. Socio-economic status was controlled by assessing children within a single geographic area. Information regarding socioeconomic status was obtained from census data (Australian Bureau of Statistics, 2001). The index of relative socio-economic advantage, which considers income, education, qualifications, and occupation, placed the area in the bottom 10% of the population. No children with diagnosed disabilities, according to school records, were included in the study.

Information regarding the bilingual group's home language use was confirmed through parent interview. This was completed over the phone by a fluent bilingual Samoan-English speaking teacher. Initially the interview discussed family composition,



including the number of adults, as well as the number and ages of children residing at the home. Confirmation of the predominant use of Samoan at home during the children's first 2 years of life was also obtained. Information was then obtained about current language use at home. The questionnaire used in the interview is provided in Appendix A. Questions 1–3 addressed the amount of Samoan used by others when speaking to the child at home, and questions 4–6 evaluated the amount of Samoan used by the child when talking at home. For these questions parents responded on a five point scale where 1 = “not at all” and 5 = “all the time”.

Responses to parent questionnaires revealed that Samoan was the primary language heard in the home environment during the participants' first 2 years of life. At the time of the study, Samoan was also the primary language used by adults at home when interacting with the target child (average score on questions 1–3 = 4.3). Given the parents' ability to use at least basic English, it is highly likely that children were exposed to language mixing and heard utterances containing elements from both L1 and L2 (Goodz, 1989). This is consistent with children from a sequential bilingual background, with L1 initially being the primary language heard at home, with increasing exposure to L2 over time as the family interacts with L2 through media, friends and community interactions. Although all children would have been exposed to both Samoan and English in varying degrees, their language exposure would be described as predominantly Samoan prior to starting school.

A different pattern was discovered on questions regarding child language use at home. Here, all parents responded that little or no Samoan was used by their child when interacting at home (average score on questions 4–6 = 1.5). As discussed above, parents in the study had at least a basic level of English competency. This bilingual heritage would have served to limit communication breakdowns during adult-child interactions. In fact, several parents noted that they encouraged their children to use English at home. This pattern is common in bilingual communities where L1 is not valued by the majority community. For example, Spanish-English children in the USA “quickly learn that English is the preferred language and that there is limited value in using and maintaining Spanish” (Hammer, Miccio, & Rodriguez, 2004, p. 26).

Once Samoan-English participants had been confirmed as meeting criteria for participation in the study, a monolingual English-speaking comparison group was recruited. Teachers selected a monolingual child for each bilingual child in their class, i.e., a typically developing child of the same gender and within two months of the comparison bilingual child's age. In one case a child the same age but different gender was selected as a comparison child due to limited numbers of monolingual English speaking children at the centre.

The bilingual group consisted of four boys and five girls, while the monolingual English-speaking group consisted of five boys and four girls (participant details presented in Table I). The groups were well matched for age (Mann-Whitney  $U = 23.5$ ,  $p = .136$ ). The mean age at first assessment for the bilingual group was 57.1 months (SD 2.84; range 55–62 months) and for the monolingual English-speaking group was 55.1 months (SD 2.97; range 51–61 months).

### Stimuli

Receptive Vocabulary and Picture Naming tasks were developed for the study (see Appendix B and C for English and Samoan task items). Items were selected from the Australian English Vocabulary Inventory: OZI, which contains wordlists of common nouns used by Australian children (Schwarz & Burnham, 2006). Altogether, 316 nouns were considered for inclusion in the tasks in the semantic categories of animals, vehicles, toys, food and drink, clothing, body parts, household items, furniture, rooms, outside things, places to go, and people. To ensure words selected for the bilingual assessments were consistent with the experiences of Samoan-English bilingual children, a Samoan-speaking teacher ruled out words that were less common in Samoan culture (e.g., *turkey*, *tricycle*, *biscuit*, *beanie*). A Samoan equivalent was then provided for remaining words. The teacher was specifically asked to translate each word “as a typical preschool child would say them”, rather than providing formal labels. The final Samoan wordlist was confirmed through independent review by three other Samoan speaking adults engaged in professional occupations. Only words with 100% agreement between the Samoan speakers were used in the lexical tasks.

Table I. Participant characteristics for bilingual and monolingual children.

Participant	Group	Gender	Age in months
1	Monolingual English	Female	55.00
2			55.00
3			59.00
4			62.00
5		Male	55.00
6			55.00
7			55.00
8			57.00
9			61.00
10	Bilingual Samoan-English	Female	51.00
11			53.00
12			56.00
13			57.00
14			61.00
15		Male	53.00
16			54.00
17			54.00
18			57.00

developed for the study. Each task contained a mix of words from the above semantic categories.

The Receptive Vocabulary task evaluated receptive lexical processing. On each of 72 items, children were presented with four 6cm square colour pictures in a two by two grid. The examiner asked the child to identify an item (e.g., "Point to the *bus*.") following which the child selected and pointed to a corresponding picture. The three foil pictures were in the same semantic category with matching features and/or function (e.g., *car*, *train* and *truck*). The Picture Naming task measured expressive lexical skills. Children were required to label 72 colour pictures (6cm<sup>2</sup>).

### Procedure

Each child was tested at their preschool in a quiet room during school hours. Children were tested twice over the research period. The initial assessment took place after approximately 10 weeks of preschool attendance. Review assessment, which employed identical tasks to the first assessment, took place approximately 6 months later (after approximately 30 weeks of schooling). During each assessment, the English skills of the bilingual children and their monolingual English-speaking peers were tested over two short sessions (total assessment time 30 minutes). Each session was on a different day. The Picture Naming task was administered in the first session, and the Receptive Vocabulary task during the second. All English tests were administered by an experienced monolingual English speech-language pathologist.

One week following completion of English assessment, the same tasks were completed in Samoan with the bilingual group, again over two short sessions. All Samoan tests were administered by a teacher whose L1 was Samoan. At all times during the Samoan assessment the teacher spoke Samoan, no English was used. In the Picture Naming task, if children responded in English, they were directed (in Samoan) to speak in Samoan, e.g., "Can you give the Samoan word?"

Consistency and integrity of experimental tasks across languages was ensured by administering each test using set instructions and sufficient practice items to make task comprehension certain. The two assessors administered the assessments identically in the two languages. Labelling tasks were tape-recorded so that accurate transcription of responses could be achieved, without lengthening the assessment session.

### Scoring and data analysis

When scoring tasks administered in English, only correct English responses were counted as correct. Similarly, when scoring the Samoan assessments, only Samoan responses were counted in the total correct score. Composite scores were also obtained

on both tasks for the bilingual group. This measure of cross linguistic lexical ability was calculated by counting the total number of lexical items correctly identified or labelled across languages. For example, if a child labelled an item correctly in one language only, it was counted as correct. If an item was correctly labelled in both languages, it still only obtained one point in the composite score. When a word was not labelled correctly in either language the child did not score on that item. An example is provided in Table II.

Translation equivalents (TEs) and singlets were also counted in both the Receptive Vocabulary and Picture Naming tasks for the bilingual group. A TE was noted where a child understood or used a word correctly across both languages. A singlet occurred where a lexical item was only known in either L1 or L2.

Non-parametric statistics were used to analyse differences due to the small group sizes and highly variability of their performance.

## Results

The results of the study will be presented in three sections:

1. Bilingual cross-linguistic profiles (examining Samoan and English data) are analysed to investigate the effects of language, modality (receptive versus expressive) and changes over time (the first assessment preceded the second assessment by six months).
2. Bilingual composite profiles are described. Scores combining known words from both languages are explored to investigate the distribution of lexical items across languages.
3. Bilingual language skills are compared with monolingual matched controls.

### Bilingual cross-linguistic profiles

Mean language scores for the bilingual children in Samoan and English are shown in Table III. Scores are reported for initial (Time 1) and follow up (Time 2) assessments.

Table II. Example of Calculation of Composite Score to Obtain a Measure of Total Lexical Ability across L1 and L2.

	English	Samoan	Composite
Soap	X	✓	✓
Sandwich	✓	X	✓
Watch	X	✓	✓
Shorts	X	✓	✓
Camera	✓	X	✓
Giraffe	✓	✓	✓
Fire truck	X	X	X
Kite	✓	✓	✓
Brush	X	✓	✓
Arm	X	X	X
Total Score /10	4	6	8

Table III. Mean (SD) Samoan and English scores for bilingual children at initial and follow up assessment (max score = 72).

	Receptive Vocabulary		Picture Naming	
	English	Samoan	English	Samoan
Time 1	49.8 (12.04)	57.6 (6.48)	40.2 (10.20)	12.2 (10.88)
Time 2	58.9 (6.52)	63.1 (6.08)	50.0 (7.87)	17.2 (13.08)

Wilcoxon matched pairs analyses were used to compare L1 and L2 in the bilingual group. Total scores on the Receptive Vocabulary test did not differ between English and Samoan at Time 1 ( $z = 1.54$ ,  $p = .12$ ) or Time 2 ( $z = 1.84$ ,  $p = .66$ ). Conversely, there was a significant difference between Picture Naming scores in English and Samoan at both Time 1 ( $z = 2.55$ ,  $p < .05$ ) and Time 2 ( $z = 5.67$ ,  $p < .01$ ). As the mean scores in Table I show, this difference was due to the mean English Picture Naming score being 28 points higher than the Samoan Score on the same test at Time 1, and 32.8 points higher at Time 2.

Investigation of language scores over time revealed that bilingual children significantly improved their mean Receptive Vocabulary score between first and second assessment in both English ( $z = 2.52$ ,  $p < .05$ ) and Samoan ( $z = 2.13$ ,  $p < .05$ ). Similarly, there was improvement in mean Picture Naming scores over time in English ( $z = 2.56$ ,  $p < .05$ ) and Samoan ( $z = 2.18$ ,  $p < .05$ ).

#### *Bilingual composite profiles*

Wilcoxon matched pairs analyses were used to investigate the composite language profiles of the bilingual group. Composite scores were calculated for each bilingual child. Group means are presented in Table IV. Scores are reported for initial and follow up assessment. Over time, mean bilingual composite scores for Receptive Vocabulary and Picture Naming were always higher than mean scores achieved in either Samoan or English.

The mean composite score for Receptive Vocabulary was significantly higher than the composite Picture Naming score at both Time 1 ( $z = 2.67$ ,  $p < .01$ ) and Time 2 ( $z = 2.67$ ,  $p < .01$ ). As with individual language totals, mean composite scores showed significant improvement between first and second assessment (Receptive Vocabulary:  $z = 2.55$ ,  $p < .05$ ; Picture Naming:  $z = 2.66$ ,  $p < .01$ ).

Composite scores allowed calculation of the proportion of Translation Equivalents (TE: items identified or labelled corrected in both L1 and L2) versus singlets (items identified or labelled correctly in *either* L1 or L2). In Receptive Vocabulary, there was a significant difference between first and second assessments in the number of TEs ( $z = 2.67$ ,  $p < .01$ ) and singlets ( $z = 2.31$ ,  $p < .05$ ). Group means revealed an increase in TEs over time (from 41.9 to 55.0 of a possible 72) and a decrease in singlets (from 25.0–15.1). Conversely, there was no

difference in the number of TEs ( $z = 1.26$ ,  $p = .21$ ) or singlets ( $z = 1.48$ ,  $p = .14$ ) on the Picture Naming task. These results are shown in Figure 1.

#### *Bilingual versus monolingual language profiles*

Mann-Whitney U tests compared the bilingual Samoan-English group to matched monolingual English peers. When comparing English only scores, the bilingual group demonstrated significantly lower Receptive Vocabulary scores than matched monolingual English-speaking peers at both Time 1 ( $U = 3.50$ ,  $p < .01$ ) and Time 2 ( $U = .50$ ,  $p < .01$ ). However, when monolingual Receptive Vocabulary scores were compared to bilingual composite scores, there was no significant difference at either Time 1 ( $U = 28.0$ ,  $p = .30$ ) or Time 2 ( $U = 25.0$ ,  $p = .19$ ). Mean scores are presented in Table IV.

There was a different pattern on the expressive vocabulary task. When using English only scores, the bilingual group demonstrated significantly lower Picture Naming scores than matched monolingual peers at both Time 1 ( $U = 2.5$ ,  $p < .01$ ) and Time 2 ( $U = 1.5$ ,  $p < .01$ ). Unlike Receptive Vocabulary however, this result did not change when monolingual Picture Naming scores were compared to bilingual composite scores. The bilingual group means continued to be significantly below monolingual group means at both Time 1 ( $U = 7.0$ ,  $p < .01$ ) and Time 2 ( $U = 7.5$ ,  $p < .01$ ). Mean scores are presented in Table IV.

#### **Discussion**

This paper presents a longitudinal investigation into the language development of Samoan-English bilingual children during their first year at school. Understanding and use of Samoan and English was assessed when children had completed 10 weeks of preschool and then 6 months later. Discussion of results follow, outlining Samoan and English development in the bilingual group, additional information obtained from composite profiles, as well as an examination of scores in the bilingual group compared to the monolingual English control group.

#### *Samoan (L1) development in the bilingual group*

The trajectory of L1 development can be affected by introduction of a second language. However, the

effect is unclear within the diversity of results reported for ESB children. Some studies report a decline or stabilization of L1 over time (Kan & Kohnert, 2005; Leseman, 2000; Wong-Fillmore, 1991). Other studies report little or no L1 decline (Cummins, 1981, 1984; Hakuta et al., 2000; Ramírez, 1992).

The Samoan-English ESB children in the current study showed significant growth in their Samoan lexical development in the 6 month period reported. There was no evidence of L1 decline despite increased exposure to English during the research period. This finding supports the hypothesis that L1 outcomes in sequentially bilingual children reflect the presence and support of L1 in the home and wider community of the child (Kan & Kohnert, 2005). In contrast to Kan and Kohnert's study, where there was no evidence of L1 growth (nor regression), the children in the current study continued to experience L1 development following the significantly increased exposure to L2. Samoan language skills may have been less vulnerable to decline given established regular interactions with family members, extended family (often living in the same house), as well as embedded community opportunities for L1 interaction through social, sporting and church networks.

An unexpected finding in the bilingual group was the significant difference between L1 receptive and expressive scores. Receptive vocabulary was well developed with good improvement in scores over time. This result was confirmed by the Samoan assessor who indicated that the group demonstrated a good understanding of conversational Samoan. Conversely, although Samoan Picture Naming did improve over time, mean scores remained below 20/72, even at second assessment. Several children scored less than 10.

This result is less surprising when considered with information provided by the bilingual children's families. Questionnaires consistently indicated that children predominately used English when communicating with parents and siblings. Although adults maintained their linguistic heritage through predominant use of Samoan at home, the influence of English was significant, with parents of all participants speaking at least basic English (this being the language of education in Samoa). It appears then, that families may have embraced the use of English at home as this was part of their own linguistic heritage. Low scores on Samoan spoken tasks in this study

would hence reflect a cultural value toward English and limited experience using L1.

The assessment context may have also influenced the children's performance. Although the Samoan assessor only used Samoan in her interactions, the children would consider the preschool setting to be an English-language setting. It is not known if this factor affected the children's results. Regardless of the cause, the contrast between the children's receptive and expressive L1 abilities needs to be interpreted as language difference rather than disorder. This result highlights the importance of interpreting bilingual assessment data in light of language exposure and usage across environments.

Socio-linguists assist in explaining the pattern. In a discussion of intergenerational language transmission, Borland (2006) proposes a continuum of L1 ability levels from receptive competence only to active transmission where the child can understand and use L1 fluently at home. The children in the current study would be defined as having receptive competence, with "sufficient understanding of a language to be able to accurately comprehend an everyday conversation between native speaking adults, even if they are not able to respond in the language in question" (Borland, 2006, p. 24). Borland notes that the level of L1 language transmission varies greatly between cultures and environments, depending greatly on aspects of the social and political context as well as family motivation and commitment to actively promote L1. Pease-Alvarez (2002, p. 124) reported that many bilingual families are influenced by the values and norms of monolingual people in their setting, including "the desire to uphold standards of native speakers who reside in monolingual speech communities ... they wanted their children to learn both languages perfectly ... as spoken by native speakers."

#### *English (L2) development in the bilingual group*

Parent questionnaires indicated that the bilingual group chose to use English during everyday interactions. This suggested that English lexical development may have been stronger than anticipated. In fact, there was no significant difference between Samoan and English receptive lexicon over time. While the group did significantly improve their English receptive scores over time, lexical growth was at a similar rate to Samoan. As a result, scores remained comparable at time one and time two in

Table IV. Mean bilingual composite and monolingual English scores at initial and follow up assessment (max score = 72).

	Receptive Vocabulary		Picture Naming	
	<i>Bilingual Composite Score</i>	<i>Monolingual English Score</i>	<i>Bilingual Composite Score</i>	<i>Monolingual English Score</i>
Time 1	66.9 (3.91)	65.67 (3.20)	44.3 (10.51)	60.44 (7.23)
Time 2	70.22 (1.99)	68.78 (2.33)	56.0 (7.63)	66.11 (2.80)



both Samoan (heard from adults in their home environment) and English (heard with older siblings, friends and in the community). In this way, the receptive lexicon of the bilingual group would be described as balanced across languages (Kohnert & Bates, 2002; Magiste, 1992).

There was a different picture expressively. The group demonstrated significantly higher Picture Naming scores when completing the task in English rather than Samoan. A comparison of English and Samoan Picture Naming indicated that English scores were 28 and 32.8 points higher at time one and time two respectively (see Table I). In this way, English was clearly the dominant, or better, language with regards to expressive lexical efficiency.

This pattern again highlights the importance of considering socio-linguistic factors when exploring language development in sequentially bilingual children: “depending on the degree of exposure to a particular language and how the exposure was provided . . . these children will show varied acquisition characteristics” (Hammer et al., 2004, p. 24). In this context, active transmission of the Samoan lexicon has been limited, with preference for L2 use even when talking with Samoan speaking adults. This further supports description of the study group as having receptive competence (Borland, 2006).

#### *Bilingual composite profiles*

Kan and Kohnert (2005, p. 280) emphasize that use of single language vocabulary scores, in first or second language, do not give an overall valid picture of skill levels, “even when one of those languages appears to be dominant or stronger”. For this reason, composite scores were calculated in the bilingual group, counting the total number of lexical items correctly identified or labelled across languages. At Time 1 and Time 2, in both Receptive Vocabulary and Picture Naming tasks the resulting score was always higher than mean scores achieved in either Samoan or English. For this reason, it provided a more meaningful measure of the bilingual group’s total lexicon.

Data collected during composite assessment also provided valuable information regarding lexical composition. Lexical composition is interesting because it explores the distribution of concepts across the two languages possibly reflecting social contexts of L1 and L2 use. The proportion of Translation Equivalents (items identified or labelled correctly in both L1 and L2) and singlets (items identified or labelled correctly in *either* L1 or L2) were calculated. On the Receptive Vocabulary task, bilingual children showed different TE and singlet profiles at first and second assessments. There was a significant increase in TEs over time, and a corresponding significant decrease in singlets (see Figure 1).

Previous studies have also reported this pattern in simultaneous bilingual children (e.g., Marchman &

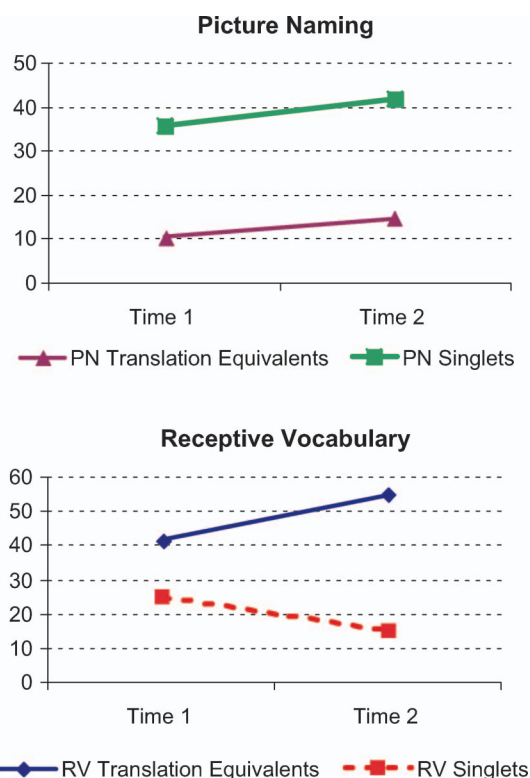


Figure 1. Mean Number of Translation Equivalents (items identified or labelled correctly in both L1 and L2) versus Singlets (items identified or labelled correctly in either L1 or L2) on Receptive Vocabulary and Picture Naming tasks.

Martínez-Sussmann, 2002; Pearson et al., 1993; Peña et al., 2002) and ESB children (Kan & Kohnert, 2005). It appears that during early childhood, children do not attempt to build vocabulary by looking for L1 translations. Rather, the focus is on adding new items to each individual lexicon. As exposure to English increases so do TEs, with children learning to represent lexical concepts in both L1 and L2 (Peña et al., 2002).

This consistent pattern of developmental difference in bilingual children has potential for use in clinical settings. Tracking singlet and TE development over time in a child with suspected language disorder may be a mechanism for determining whether language is following typical bilingual acquisition patterns. It is possible that a child with language disorder may be slow to acquire TEs and demonstrate a reduced number of singlets in each language. Further research would be necessary to confirm this.

TE and singlet patterns observed in the receptive tasks were not replicated in the picture naming task. There were very few Samoan singlets observed. However this finding was not surprising given the bilingual groups’ limited expressive skills in Samoan.

#### *Comparison of bilingual and monolingual language profiles*

The bilingual group demonstrated significant English lexical growth over the period of the study. While



receptive lexical scores suggested language balance between L1 and L2, English dominance was clearly evident on expressive tasks. Despite this, receptive and expressive vocabulary scores remained significantly below monolingual peers. This was an expected pattern of language difference, with previous studies among similar populations also noting slow L2 acquisition (e.g., Hemsley, Holm & Dodd, 2006; Schaerlaekens, Zink & Verheyden, 1995) and confirms the edict that a bilingual child should never be viewed as two monolingual children in one (Grosjean, 1982).

When monolingual receptive scores were compared to bilingual *composite* scores, there was no difference at Time 1 or Time 2. That is, composite vocabularies in the early sequential group mirrored single language scores for monolingual children (see Table III). One previous study has reported this close correlation between monolingual and bilingual patterns of vocabulary growth using composite measures (Pearson et al., 1993). Further research is necessary to establish the validity of using composite scores to compare bilingual children to monolingual norms (obviously limited by the availability of standardized culturally-appropriate assessment tools).

By taking both L1 and L2 into account, composite scores show a child's linguistic potential to understand and use words. Counting aptitude in each language compensates for the diversity of language exposure in L1 and L2 (Bedore et al., 2005). Hence, this methodology has great potential for comparing children from heterogeneous backgrounds. For example, a child who interacts mostly in Samoan at home could be compared to a child who interacts using some Samoan at home, and even a peer who speaks only English. Pearson et al. (1993) concluded that bilingual norms, if available, would closely mirror monolingual norms. Thus, a child with a central language disorder may demonstrate reduced composite vocabulary acquisition compared to peers.

From a clinical perspective, this information provides a starting point for speech-language pathologists to validly assess early sequential lexical development in the absence of bilingual normative data for a particular language pair. Further research is required to develop and streamline this little-used methodology.

As expected, there was a different pattern on the expressive vocabulary task. Although the bilingual group was considered to be typically developing, composite Picture Naming scores were consistently low when compared to monolingual peers. As discussed above, this would be described as bilingual language difference rather than disorder. This finding presents a timely caution. The unrestrained use of any assessment methodology without considering the cultural and linguistic status of a child presents the risk of incorrect diagnosis of language disorder. In this instance, the use of expressive composite

scores to compare passively bilingual children to monolingual peers would clearly be inappropriate.

## Conclusions

This study examined the lexical development of nine sequentially bilingual children from a little-studied language pair, Samoan and English. Specifically, tasks evaluated receptive and expressive lexicon at two intervals during the groups' first year of attending school. Performance in L1 and L2, as well as composite scores allowed examination of lexical size. Lexical composition was evaluated through calculation of singlets and TEs across languages. The potential of composite scoring methodology as a clinical assessment tool was also considered.

Results indicated patterns of language difference within this group. Many predicted findings followed trends reported in the bilingual research literature. Other findings were unexpected. In particular, the limited use of L1 by children in the study group resulted in particularly low expressive lexical scores in the Samoan picture naming task. Overall, language learning outcomes appeared to be influenced by the language environment, exposure to and perceptions of L1 and L2 in the home and community. The Samoan families involved in this study appeared to actively maintain their Samoan linguistic heritage but supported English use by their children. For these parents, English was valued not only as the dominant language of the community, but also a part of their own upbringing.

Evaluation of the group in both L1 and L2 also confirmed problems associated with assessment in one language only. Although the children clearly preferred to use L2 in their daily interactions, evaluation of lexical abilities in their dominant language only would have greatly underestimated overall lexical size and composition. Conversely, composite scores provided a valid measure of linguistic potential to understand and use words. Importantly, receptive composite scores closely mirrored English scores in a monolingual control group. This result has great clinical significance, confirming the potential role of composite scores in separating language difference from disorder in bilingual children. Further research is necessary to refine this methodology and to explore the relationship between lexical-semantic skills and other linguistic abilities.

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**Appendix A***Parent Questionnaire – Language Use at Home*

Child's name:

Date of Birth:

Number of adults living at home (and relationship to child):

Number of younger siblings living at home (and ages):

Number of older siblings living at home (and ages):

Name of adult completing questionnaire:

Relationship to child:

Which language did your child mostly hear at home between birth and 2 years of age?

Scale used for following questions:

Always                      Mostly                      Half Samoan/Half English                      Sometimes                      Never

1. When you talk with [child], how often do you use Samoan?
2. When you talk with other adults at home, how often do you use Samoan?
3. When other adults at home talk with [child], how often do they use Samoan?
4. When [child] talks with you, how often does he/she use Samoan?
5. When [child] talks with his siblings, how often does he/she use Samoan?
6. When [child] speaks with Samoan friends how often does he/she use Samoan?

**Appendix B***English / Samoan Receptive Vocabulary Task Items (72)*

arm / lima	foot / vae	mop / mop
blocks / poloka	fork / tui	motorbike / uila afi
box / pusa	fridge / pusa aisa	photo / ata
boy / tama	friends / uo	picture / ata
broom / salu	game / ta'aloga	pig / pua'a
brush / sele ulu	garage / fale ta'avale	pillow / aluga
bubbles / bubbles	gloves / totini lima	plane / va'a lele
bucket / pakete	glue / kelu	playground / malae ta'alo
bus / pusi	grapes / vine 'ai	postman / tamaloa tufa meli
cake / keke	hand / lima	pram / ta'avale toso
carrot / kaloti	house / fale	puzzle / paso
chair / nofoa	ice-cream / aisi kulimi	pyjamas / ofu moe
chicken / moa vela	jacket / ofu mafanafana	rain / timu
child / tamaititi	jelly / jelly	shop / fale olo
chips / chips	juice / vai inu suamalie	socks / totini vae
clock / uati	jumper / ofu mafanafana	spider / apogaleveleve
comb / sele ulu	kangaroo / tagalu	sultanas / vine 'ai
corn / saga	koala / koala	tiger / tiger
couch / nofoa	ladder / ape fai	toes / tamai vae
cup / ipu ti	lamp / moli	toothbrush / pulumu fulu nifo
cupboard / kapoti	leg / vae	tractor / palau
dress / ofu teine	light / moli	truck / ta'avale
duck / pato	lounge-room / potu malolo	watch / uati
fish / i'a	milk / susu	zip / sipi

**Appendix C***English / Samoan Picture Naming Task Items (72)*

ant / loi	fireman / tamaloa fui mu	possum / possum
arm / lima	flower / fuga la'au	present / mea alofa
ball / polo	foot / vae	pumpkin / maukeni
balloon / paluni	frog / lage	puppy / tamai maile
banana / fai	giraffe / giraffe	rabbit / lapiti
basket / 'ato	glass / ipu malamalava	sandwich / sanuisi
bat / pate	grapes / vine 'ai	school / a'oga
bedroom / potu moe	hand / vae	shirt / ofu tino
bike / uila vili vae	helicopter / helicopter	shorts / ofu vae pupu'u
bird / manulele	jacket / ofu mafanafana	soap / fasimoli
boat / va'a	jumper / ofu mafanafana	spoon / sipuni
book / tusi	key / ki	steps / fa sitepu
brush / sele ulu	kitchen / potu kuka	strawberry / strawberry
button / fa'amau ofu	kite / maua	sultanas / vine 'ai
camera / mea pu'e ata	lamp / moli	teacher / faia'oga
chair / nofoa	leg / vae	teddy / teddy
chocolate / sukalati	light / moli	telephone / telefoni
clock / uati	lion / liona	toast / falaoa fa'a pa'u
comb / sele ulu	moon / masina	tongue / laulau faiva
couch / nofoa	photo / ata	towel / solo ta'el
dad / tama	picture / ata	train / nofoa afi
doll / pepe ta'alo	pizza / pizza	tummy / manava
fingers / tamai lima	policeman / leoleo	vacuum / vacuum
fire truck / ta'avale fui m	pool / vai tae'le	watch / uati

# Chapter 3

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## Conceptual distance and word learning: Patterns of acquisition in Samoan-English bilingual children

Hemsley, G., Holm, A., & Dodd, B. (2012). Conceptual distance and word learning: Patterns of acquisition in Samoan-English bilingual children. *Journal of Child Language*, 40(04), 799-820.

## **Preface**

The longitudinal study reported in chapter 2 also explored the significance of word type for lexical learning in typically developing Samoan-English bilingual children. The receptive and expressive vocabulary tasks evaluated acquisition of four word types: cognates, matched nouns, phrasal nouns and holonyms. Each word type had varying phonological and conceptual difference between Samoan (L1) and English (L2). Word learning processes suggested by Lindsay and Gaskell (2010) led to predictions that word types with conceptual/phonological similarity would show faster uptake than those with greater conceptual/phonological distance.

This study highlights two aspects of L2 lexical learning not previously demonstrated by children in a natural language learning environment. First, results provide concrete evidence that L1 representations have a direct impact on L2 word learning. Second, conceptual distance is identified as a key factor in the speed and ease of L2 lexical acquisition.

## **Conceptual distance and word learning: Patterns of acquisition in Samoan–English bilingual children\***

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### ABSTRACT

This study investigated cross-linguistic influence in acquisition of a second lexicon, evaluating Samoan–English sequentially bilingual children (initial mean age 4;9) during their first 18 months of school. Receptive and Expressive Vocabulary tasks evaluated acquisition of four word types: cognates, matched nouns, phrasal nouns and holonyms. Each word type had varying phonological and conceptual difference between Samoan (L1) and English (L2). Results highlighted conceptual distance between L1 and L2 as a key factor in L2 lexical acquisition. The children acquired L2 lexical items earlier if their conceptual representation was similar to that of L1. Words with greater conceptual distance between L1 and L2 emerged more slowly. This suggests that L1 knowledge influences L2 lexical consolidation for sequential bilinguals. Words that require a conceptual shift from L1 take longer to consolidate and strengthen within the L2 lexicon.

### INTRODUCTION

This study investigated second language acquisition in typically developing sequential bilingual children. These preschool age children learned Samoan as a first language (L1) from birth. English was introduced as a second language (L2) during early childhood. Specifically, word learning across four word types was investigated. These word types demonstrated varying levels of phonological and conceptual similarity between L1 and L2. This allowed analysis of the influence of phonological and conceptual factors in the acquisition of a second language.

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*Word learning*

Childhood word learning is a complex process. For each new word children hear, they must “attend to the semantic cues in the environment, must store and retrieve the derived meaning of words, and must associate meaning with the phonological form of the word” (Gray, 2005: 1453). This process of acquisition involves two distinct stages occupying two distinct areas of the brain: fast mapping and lexical consolidation.

The initial ‘fast mapping’ stage of learning occurs following limited word exposure. The child creates a ‘recording’ linked with available conceptual, syntactic and phonological information (Kan & Kohnert, 2008). Even at this point, relatively stable memories exist, with evidence of detailed phonological form representations in recognition tasks (Gaskell & Dumay, 2003). The nature of these representations, however, is different to those of words already fossilized within the lexicon. This early stage of learning occurs in the medial temporal lobe (MTL), where novel words and their related knowledge remain “functionally separated from the established lexicon” (Lindsay & Gaskell, 2010: 48).

Lexical consolidation occurs when new representations are ‘laid down’ in the established lexicon. Evidence for this is seen where a novel word (such as *cathedruke*) engages in lexical competition with an established lexical item (*cathedral*) during word-recognition tasks. Two key components have been identified in this process (Dumay & Gaskell, 2007; Gaskell & Dumay, 2003). The first is familiarity, with multiple exposures to novel words increasing the likelihood of lexical competition. The second is time, with lexical competition only appearing days after initial introduction of novel words. In particular, “sleep provides an opportunity for regions of the MTL to reciprocally activate the neocortex, resulting in neocortical consolidation” (Lindsay & Gaskell, 2010: 53).

*Word learning in bilinguals*

Word learning in a sequential bilingual context adds a further dimension to an already complex process because bilingual children learn and add new words to two, inter-related lexicons. Models of the bilingual lexicon highlight this complexity. Like monolingual models, representations store conceptual, lexical and phonological information (Costa, Santesteban & Caño, 2005; Kroll, Sumutka & Schwartz, 2005). In contrast, representations appear across two languages. Information stored at the conceptual and phonological levels is shared across languages and is not language-specific. Conversely, the lexical level is thought to be language-specific, with conceptual information linking with corresponding, but separate, L1 and L2 representations (Kroll & Stewart, 1994; Kroll *et al.*, 2005).



The separation of L1 and L2 at the lexical level allows for varied word storage. Some representations will be unique to L1 or L2. Other words, known as translation equivalents (TEs), are found in both L1 and L2. The mix of unique words and TEs in a bilingual child's vocabulary produces two varied lexicons. The length of time and level of exposure a child has to L1 and L2 will determine the size and composition of each lexicon (Hemsley, Holm & Dodd, 2010; Peña, Bedore & Zlatic-Giunta, 2002).

The size and composition of L1 and L2 lexicons can also vary according to test modality. While children are able to readily 'fast map' new words, evidence of lexical consolidation appears receptively before expressively. This trend appears in a number of studies into early sequential bilinguals.

Kohnert and Bates (2002) found the transition from L1 to L2 dominance occurred earlier receptively, with L2 dominance emerging in children with an average of 6.9 years of L2 experience. Approximately three years of additional L2 exposure were necessary to obtain L2 dominance in expressive lexical tasks. Similarly, Hemsley, Holm and Dodd (2006) found receptive lexical skills significantly stronger than expressive abilities in two sequential bilingual groups with approximately six years of L2 exposure. These results highlight the lengthy process of lexical consolidation, with long-term exposure necessary to develop a comprehensive L2 lexical footprint.

During the lengthy process of acquiring a second language, bilingual speakers simultaneously access L1 and L2 lexical representations during language tasks. They activate word alternatives in both L1 and L2, even in tasks that are language exclusive (Costa, 2005; Kroll *et al.*, 2005). For example, during an L2 language activity, related words in the L1 lexicon will also be activated. Executive function modulates language selection and use, employing processes such as attention, memory and inhibition. In this way, bilinguals possess a "dynamic system in which there is the potential for interplay between the languages within the developing speaker" (Kan & Kohnert, 2008: 500).

#### *The interplay between languages*

The term 'cross-linguistic influence' (or 'cross-linguistic transfer') refers to the interplay between the two languages of a bilingual speaker. It occurs where knowledge or resources from one language have an effect on use of the other (Kohnert, 2008). Of the several factors that may impact on this phenomenon, typological relations between L1 and L2 appear paramount (Kellerman, 1995; Kohnert, 2008). That is, languages with a degree of syntactic, conceptual, lexical and/or phonological similarity (e.g. French–Spanish) should be more conducive to cross-linguistic influence than those with limited overlap (e.g. Vietnamese–English).

Functionally, the interplay between lexicons is seen in research involving cognates. Cognate words belong to the lexicon of one language but are ‘borrowed’ from another (Roberts & Deslauriers, 1999).<sup>1</sup> They subsequently have similar conceptual and phonological representation across the two languages (Yudes, Macizo & Bajo, 2010), such as *pen* and *peni* in English and Samoan. Small differences in phonological representation frequently occur, typically when the borrower alters sounds or word shape to reflect the phonotactic rules of its own language. In contrast, non-cognates refer to a single concept but have little or no phonological resemblance (e.g. *spider* and *apogaleveleve*).

Studies evaluating language performance on tasks including cognates and non-cognates indicate that bilinguals consistently perform faster and more accurately on cognates (Costa, Caramazza & Sebastian-Galles, 2000; Costa *et al.*, 2005). Cognates have “a positive effect not only on the speed with which words are produced, but also on how resistant they are to momentary malfunctioning of the lexical retrieval system” (Costa *et al.*, 2005: 95). This effect appears particularly strong where L1 (the stronger language) facilitates L2 (de Groot, Borgwaldt, Bos & van den Eijnden, 2002).

While cognates facilitate language performance, evidence exists that cross-linguistic influence can also be inhibitory. Conceptually different languages produce negative effects on language processing and expression. For example, differences in conceptual organization of positional language in German and English resulted in significantly different output during descriptive language tasks (Carroll & Von Stutterheim, 1993). Theoretically, if these languages were introduced sequentially, the conceptual differences between German and English would work to hinder cross-linguistic acquisition of positional language (Kellerman, 1995).

### *Study aims and predictions*

Much of the research into cross-linguistic influence focuses on LATE sequential bilinguals who acquire another language during or after the teenage years. Research into cross-linguistic influence in EARLY sequential bilinguals, where a second language is introduced during the first five years of life, is limited. Further, the majority of studies focus on syntax. They

[1] Haugen (1956) coined the term ‘diamorph’ to describe cross-linguistic word pairs, in which relationships of phonology and/or meaning occur between the lexical items in each language. Clyne (1991) referred to homophonous diamorphs as cross-linguistic morphological elements with similar phonological shape. This term referred not only to lexical morphemes but also to grammatical morphemes. Their presence in conversation was hypothesized to be a transition point for code-switching. In the current article, we consider only lexical morphemes with similar conceptual and phonological representation: these are commonly referred to in the literature (and this article) as ‘cognates’.

evaluate the influence of one set of grammatical rules on production of a second language. Outside the cognate effect, research into lexical cross-linguistic influence is limited.

While the cognate literature points to cross-linguistic interplay between L1 and L2 at a PROCESSING level, it is not yet clear if or how the L1 lexicon influences L2 ACQUISITION. No previous research studies have investigated whether certain words types, such as cognates, are more easily consolidated into the L2 lexicon. The literature emphasizes the need for further research into this area, “as it lies at the heart of educational and clinical treatment issues” (Kohnert, 2008: 78). An understanding of mechanisms that facilitate or hinder the learning process for sequential bilinguals would have obvious benefits for language clinicians and educators alike.

This article pursues Lindsay and Gaskell’s proposal that “one of the most important influences on word learning is the similarity of a new form to existing lexicophonological representations” (Lindsay & Gaskell, 2010: 58). Specifically, it explores the possibility that existing knowledge and resources from L1 facilitate retention of L2 lexical items. The methodology presented here differs from previous studies into word learning by examining real-life L2 acquisition. This was achieved by testing four-year-old sequentially bilingual children at three time-points over a 12-month period. The research focused on acquisition patterns for high-frequency, everyday vocabulary rather than vocabulary taught in a contrived or clinical setting.

The language pair investigated in the current study was Samoan–English. Consideration of these two languages revealed interesting similarities and contrasts. Samoan is an Austronesian language with many phonological similarities to English. While all Samoan vowels and consonants are found in English, Samoan uses fewer consonants and vowels overall. Also in contrast to English, Samoan phonology does not include syllable-final consonants or consonant clusters (Comrie, Matthews & Polinsky, 1996; Pratt, 1862).

Historically, the considerable English influence on Samoan has resulted in many cross-linguistic cognates. Despite these similarities, many conceptual and lexical differences also exist. When developing a list of words for tasks in the current study, the researchers observed four types of cross-linguistic word pairs:

1. **Matched nouns:** where a single concept is represented by one phonetically dissimilar word in both English and Samoan (e.g. *spider*–*apogaleveleve*; *soap*–*fasimoli*).
2. **Cognates:** the Samoan lexicon has many cross-linguistic cognates which share similar form (phonological representation) and meaning (conceptual representation). Differences only occur where an English

TABLE 1. *Summary of the conceptual and phonological distance between English/Samoan word pairs*

Word type:	Conceptually:	Phonologically:
cognates	close	close
matched nouns	close	different
phrasal nouns	different	different
holonyms	different	different

word has been altered to reflect Samoan phonology. This typically affects word shape, eliminating syllable final consonants and consonant clusters (e.g. *pen-peni*; *spoon-sipuni*).

3. **Phrasal nouns:** where a Samoan phrase represents one English word. In Samoan, descriptors are added to a base word to create a more specific meaning. The base word generally equates to a category in English. For example, *ofu* is the base word for *garment* in Samoan. Additional words add detail, so that *ofu vae pupu'u* ('garment legs short') is the Samoan phrasal noun for *shorts*, while *ofu vae u'umi* ('garment legs long') refers to *trousers*. *Ofu moe* ('garment sleeping') are *pyjamas*, and *ofu tino* ('garment body') is the phrasal noun for *shirt*.
4. **Holonyms:** where one Samoan word translates to two (or more) related words in English. The relationship between words is taxonomic: the Samoan word represents a whole of which the English words are a part/type. For example, *chair* and *couch* are both represented by *nofoa* in Samoan; while *arm* and *hand* are both *lima*.

These words differ in their phonological and conceptual representation between languages. Table 1 summarizes their characteristic differences. For the purposes of this study, phonological distance describes the degree of difference between the phonology of L1 and L2 lexical items. As expected, all categories represent words differently across languages, with the exception of cognates. For cognates, the phonological distance is minimal, with similar (or the same) representations in L1 and L2. Cognates were judged in terms of global phonological similarity between the two words, rather than phonotactic adherence to L1 phonology. Although not addressed here, it is possible that identical cognates (with shared phonotactic constraints between L1 and L2) may be more easily learned than cognates where word shape is altered to match L1 rules (e.g. *spoon-sipuni*).

Less straightforward is the concept of conceptual distance. This describes differences in conceptual representation in L1 versus L2. Words with differences in conceptual organization have greater conceptual distance than those that can be translated directly. In the current study, matched nouns

and cognates are conceptually similar: single-word representations exist in L1 and L2, with one form corresponding directly to the other. Phrasal nouns and holonyms demonstrate greater conceptual distance. Here, English and Samoan representations are not direct translation equivalents: conceptual schema/traits differ between the languages. Phrasal nouns shift from describing a lexical item (in Samoan) to providing a single-word English label with defined boundaries. For holonyms, the actual definition of lexical items differs – resulting in conceptual contrast between languages.

We hypothesized that word pairs with conceptual/phonological similarities to L1 would be easier to acquire than words without. Phrasal nouns and holonyms were of particular interest with semantic organization of these words being very different to that of English.

Specifically we predicted five outcomes on English lexical tasks:

1. that receptive and expressive scores would improve over time, reflecting expanding L2 acquisition;
2. that L2 acquisition would be stronger in receptive tasks, with slower uptake of skills in expressive tasks;
3. that due to their conceptual AND phonological similarity to L1, cognate scores would be higher compared to other word types at each assessment point (reflecting faster L2 acquisition);
4. that due to differences in conceptual AND phonological representation, phrasal nouns and holonym scores would be lower compared to other word types at each assessment point (reflecting slower L2 acquisition); and
5. that matched word scores would fall between these two groups: with conceptual similarities to L1 but different phonological representation.

#### METHOD

The language background of sequential bilinguals is highly variable. By necessity, researchers from different cultures tailor descriptions to reflect sociolinguistic factors within the population being studied. For this reason, we present the language environment and patterns of language use within the current study group in detail.

We selected a culturally and linguistically diverse suburban area for the study. The presence of Samoan within the community was strong, as evidenced by the presence of many Samoan sporting and social groups, churches, playgroups and medical services. The socioeconomic status of the area (as measured by the index of relative socioeconomic advantage) was in the bottom 10 percent of the population (Australian Bureau of Statistics, 2006).

*Participants*

The data presented were drawn from a larger longitudinal study investigating language acquisition in early sequential bilingual children. Nine Samoan–English bilingual children and nine monolingual English children participated in the study. Participants were recruited from three state preschools within the targeted geographic region. Their classrooms reflected the multicultural nature of the suburb, with a majority of children being bilingual. Approximately one-third of children in each of the preschools were from Samoan-speaking families. Children attended the preschools 2.5 days a week. As all teachers were monolingual English speakers, child–teacher interactions were in English; however, teachers noted that peers from similar linguistic backgrounds would interact using both L1 and L2 during play.

Preschool teachers identified nine Samoan–English bilingual children eligible for participation. Children were only eligible if Samoan was the primary language heard in the home during their first two years of life. None of the children previously attended childcare or kindergarten facilities. No children with diagnosed disabilities were included in the study.

Parent interviews confirmed information regarding the bilingual group's home language use. A fluent bilingual Samoan–English speaking teacher completed the interviews over the phone. Initially, the interview discussed family composition and confirmed the predominant use of Samoan at home during each child's first two years of life. Then, information was collected regarding language use at home. This addressed the amount of Samoan used by others speaking to the child at home, as well as the amount of Samoan used by the child when talking at home (Hemsley *et al.*, 2010).

Responses to parent questionnaires revealed that Samoan was the primary language heard at home during the participants' first two years of life. At the time of the study, Samoan was also the primary language used by parents at home when interacting with their children, although in each parent reported using 'a little' English when talking with their child. Given that all parents had at least basic English competence, it is highly likely that children were also exposed to language mixing with utterances containing elements from both L1 and L2. This is common in children from a sequential bilingual background (Goodz, 1989). For this reason, participants in the study would have been exposed to varying degrees of Samoan and English in their early years. On the whole, however, their language exposure would be described as predominantly Samoan prior to starting school.

A different pattern was discovered regarding child language use at home. Parents reported that little or no Samoan was used by their

child when interacting at home. In fact, several parents noted encouraging their children to use English at home. That is, the parents spoke to their children in L1 and their children responded in L2. Communication breakdowns were limited because the parents also understood at least basic English. This pattern of passive bilingualism is common in early sequential bilingual children (Hammer, Miccio & Rodriguez, 2004; Hemsley *et al.*, 2010). For example, Spanish-speaking children in the USA “quickly learn that English is the preferred language and that there is limited value in using and maintaining (expressive) Spanish” (Hammer *et al.*, 2004: 26).

We also recruited a monolingual English-speaking comparison group. For each bilingual child in the study, teachers selected a typically developing child of the same gender and within two months of the comparison bilingual child’s age. This was possible in all but one case, where a participant of the same age but different gender was selected as a comparison child.

The bilingual group consisted of four boys and five girls. The monolingual English-speaking group consisted of five boys and four girls (participant details available in Hemsley *et al.*, 2010). The two groups were well matched for age (Mann–Whitney  $U = 23.5$ ,  $p = 0.136$ ). At initial assessment the mean age for the bilingual group was 4;9 ( $SD$  2.84 months; range 4;7–5;2) and for the comparison monolingual group was 4;7 ( $SD$  2.97 months; range 4;3–5;1).

### *Stimuli*

Receptive Vocabulary and Picture Naming tasks were developed for the study. Items were selected from the 316 nouns in the Australian adaptation of the MacArthur Communicative Development Inventories (Fenson *et al.*, 1993), known as the Australian English Communicative Inventory OZI (Schwarz, Burnham & Bowey, 2006). Each task contained a variety of words from the semantic categories included in the OZI (e.g. animals, vehicles, food, clothing). Items less common to Samoan culture were identified by a Samoan-speaking teacher (e.g. beanie, tricycle, biscuit) and subsequently excluded from tasks. Items in each task were also selected to reflect differences between Samoan and English conceptual/phonological organization. A total of seventy-two items were included for each task, with eighteen items from each of the four identified word pair patterns described above: matched nouns, cognates, phrasal nouns, holonyms. Word lists can be found in the Appendix.

During the Receptive Vocabulary task, children were presented with four 6 cm square coloured pictures. The examiner asked the child to identify a target item (e.g. “Point to the bus.”) following which the child

selected and pointed to the corresponding picture. The three foil pictures were in the same semantic category with matching features and/or function (e.g. car, train and truck). The Picture Naming required children to label seventy-two coloured pictures, each 6 cm square.

### *Procedure*

We tested each child in a quiet room at their preschool during school hours. Children were tested three times over the research period. The initial assessment took place after approximately ten weeks of preschool attendance. The first repeat assessment took place about six months later (after approximately thirty weeks of schooling). The third assessment took place approximately twelve months following initial assessment, once children had commenced their first year of full-time education.

During each assessment, the English skills of the bilingual group and their monolingual peers were tested over two short sessions (total assessment time 30 minutes). Each session was on a different day. The Picture Naming task was administered in the first session, and the Receptive Vocabulary task during the second session. This sequence of administration was necessary to avoid potential word learning in the receptive task (as some items were the same across tasks). An experienced monolingual English speech-language pathologist administered all tests. We ensured consistency and integrity of experimental tasks across languages by administering each test using set instructions and sufficient practice items to make task comprehension certain. We recorded labelling tasks to achieve accurate transcription of responses without lengthening assessment time.

Parametric analyses of variance were used. Graphing of the distribution of scores demonstrated slightly negatively skewed bell-shaped curves for both monolingual and bilingual groups. To ensure the degree of skewness did not violate the assumption of normality, the numerical value for Skewness was compared with twice the Standard Error of Skewness (monolingual receptive vocabulary Skewness =  $-0.43$ ; picture naming Skewness =  $0.09$ ; bilingual receptive vocabulary Skewness =  $-1.23$ ; picture naming Skewness =  $-0.58$ ; Standard Error of Skewness range =  $+/-1.43$ ). As the value for Skewness fell within the range from minus twice the Standard Error of Skewness to plus twice the Standard Error of Skewness, the assumption of normality was not seriously violated (Coolican, 2004). A Levene's test for homogeneity of variance revealed that the picture naming task complied with the assumption of homogeneity of variance ( $p = 0.098$ ), however the receptive vocabulary task did not ( $p = 0.012$ ). The ANOVA is robust to violation of homogeneity of variance as long as similar sample sizes are used and the sample sizes are not extremely small (less than five), both of which were true in this study (Maxwell & Satake, 2006).



# PATTERNS OF WORD LEARNING IN BILINGUAL CHILDREN

TABLE 2. *Mean total receptive and expressive scores in each group (time 1 + time 2 + time 3)*

	Bilinguals		Monolinguals	
	Total score (SD)	Range	Total score (SD)	Range
Receptive	170.6 (24.4)	122-195	203.7 (6.7)	192-213
Expressive	149.4 (22.4)	114-180	195.4 (9.7)	179-208
Difference score	21.2		3.7	

## RESULTS

### *Comparison of bilingual and monolingual performance on receptive vs. expressive tasks*

Table 2 shows the mean total receptive and expressive scores for bilinguals and monolinguals. A two-factor repeated-measures ANOVA (group by task type) showed a significant effect of group ( $F(1,16)=24.703$ ,  $p<0.001$ ,  $\eta_p^2=0.607$ ), with the monolingual children performing better than the bilingual children. There was also a significant effect of task, with the receptive task eliciting better performance than the picture naming task ( $F(1,16)=39.121$ ,  $p<0.001$ ). The interaction was also significant ( $F(1,16)=7.258$ ,  $p=0.008$ ) indicating that the two group profiles of performance across tasks differed. A post-hoc independent  $t$ -test, comparing difference scores between receptive and picture naming scores, indicated that there was a greater difference for the bilingual than the monolingual group ( $t(16)=3.019$ ,  $p=0.01$ ).

### *Receptive vocabulary: longitudinal comparison of bilingual and monolingual groups*

Table 3 shows the mean bilingual and monolingual receptive vocabulary scores across the three assessments conducted. A repeated-measures ANOVA (group by total receptive vocabulary scores over time) revealed a significant difference between the bilingual and monolingual groups ( $F(1,16)=15.574$ ,  $p<0.001$ ,  $\eta_p^2=0.493$ ). Closer inspection of Table 3 indicates that the bilingual children performed less well than the monolingual group. Analysis also revealed a significant effect of assessment time ( $F(2,15)=18.287$ ,  $p<0.001$ ) with combined group scores improving over time. The interaction between group and receptive vocabulary scores over time was also significant ( $F(2,15)=5.728$ ,  $p=0.014$ ). This indicated that each group's change over time varied. Figure 1 suggests that while the monolingual group's scores varied very little across the three assessment times, the bilingual children's scores improved more markedly over time. Post-hoc assessments confirmed these findings. For the bilingual children,

TABLE 3. *Bilingual and monolingual receptive vocabulary scores across three assessments*

Assessment 1	Bilinguals		Monolinguals	
	Mean (SD)	Range	Mean (SD)	Range
Total RV score /72	49.8 (12.1)	27–63	65.7 (3.2)	61–69
Matched /18	13.0 (3.7)	7–17	17.8 (1.3)	14–18
Cognates /18	13.8 (3.4)	6–17	17.0 (1.3)	14–18
Phrasal nouns /18	11.9 (4.1)	6–18	16.0 (1.5)	14–18
Holonyms /18	10.8 (2.5)	6–14	15.9 (1.2)	14–17
Assessment 2				
Total RV score	58.9 (6.5)	46–65	68.8 (2.3)	65–72
Matched	15.9 (2.0)	12–18	17.1 (0.8)	16–18
Cognates	16.8 (1.7)	13–18	17.4 (0.5)	17–18
Phrasal nouns	15.2 (1.9)	11–17	16.9 (1.1)	15–18
Holonyms	11.0 (2.2)	6–14	17.3 (0.7)	16–18
Assessment 3				
Total RV score	62.2 (6.3)	49–70	69.2 (1.9)	66–72
Matched	16.3 (1.7)	13–18	17.7 (0.5)	17–18
Cognates	16.7 (1.5)	13–18	16.7 (1.0)	15–18
Phrasal nouns	16.3 (1.6)	13–18	17.9 (0.3)	17–18
Holonyms	12.9 (2.5)	9–16	17.0 (0.9)	16–18

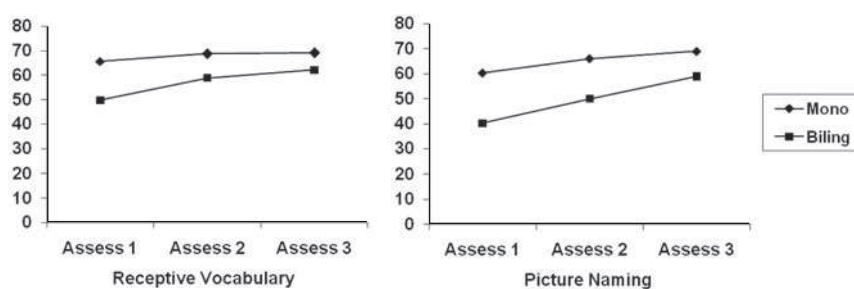


Fig. 1. Total receptive vocabulary and picture naming scores by group.

Bonferroni corrected (significance level  $p < 0.013$ ) paired  $t$ -tests indicated that Assessment 1 receptive vocabulary scores were lower than those for Assessment 2 ( $t(8) = 4.25$ ,  $p = 0.003$ ) and that Assessment 2 scores were lower than Assessment 3 scores ( $t(8) = 3.09$ ,  $p = 0.015$ ). In contrast, while the monolingual children's receptive vocabulary scores improved between Assessment 1 and Assessment 2 ( $t(8) = 6.42$ ,  $p < 0.001$ ), the analysis showed no significant difference between Assessments 2 and 3 ( $t(8) = 0.59$ ,  $p = 0.569$ ). This result is due to the monolingual group reaching ceiling performance on this task.

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TABLE 4. *Total receptive vocabulary scores according to group and word type (time 1 + time 2 + time 3)*

Word type	Bilinguals		Monolinguals	
	Mean (SD)	Range	Mean (SD)	Range
Matched words	45.2 (7.1)	32-53	51.6 (2.1)	49-54
Cognates	47.2 (6.3)	32-51	51.1 (2.2)	47-54
Phrasal nouns	43.4 (6.8)	30-51	50.8 (2.2)	48-54
Holonyms	34.7 (6.2)	24-43	50.2 (1.9)	46-52

Table 3 indicates that the pattern of performance between groups differed according to the type of words. Table 4 shows performance summed across assessments for each word type. A repeated-measures ANOVA on these data showed a significant group effect ( $F(1,16)=15.453$ ,  $p<0.001$ ,  $\eta_p^2=0.491$ ), with the monolingual group achieving higher mean scores on all word types. Combined performance differed according to word type ( $F(3,14)=19.526$ ,  $p<0.001$ ). However, Table 4 indicates that the difference between word types was due to the bilingual group who scored poorly on the holonym category, whereas the monolinguals showed consistency of performance across word types.

Post-hoc Bonferroni corrected (significance level  $p<0.008$ ) paired- $t$  testing confirmed that the monolingual group performed no differently according to word type (matched-cognates:  $t(8)=0.580$ , n.s.; phrasals-holonyms:  $t(8)=0.783$ , n.s.; matched-phrasals:  $t(8)=1.214$ , n.s.; matched-holonyms:  $t(8)=1.746$ , n.s.; cognates-holonyms:  $t(8)=1.403$ , n.s.; phrasals-cognates:  $t(8)=0.632$ , n.s.). In contrast, the bilingual group performed more poorly on holonyms than phrasal nouns ( $t(8)=6.397$ ,  $p<0.001$ ), matched words ( $t(8)=8.036$ ,  $p<0.001$ ), and cognates ( $t(8)=6.932$ ,  $p<0.001$ ). No other comparisons were significant (matched-cognates:  $t(8)=1.75$ ,  $p=0.118$ ; matched-phrasals:  $t(8)=1.403$ ,  $p=0.198$ , cognates-phrasals ( $t(8)=2.773$ ,  $p=0.026$ ). These word type comparisons are shown graphically in Figure 2.

*Picture naming: longitudinal comparison of bilingual and monolingual groups*

Table 5 shows the mean bilingual and monolingual picture naming scores across the three assessments conducted. A repeated-measures ANOVA (group by total picture naming scores over time) revealed that there was a significant difference between the monolingual and bilingual groups ( $F(1,16)=32.108$ ,  $p<0.001$ ,  $\eta_p^2=0.667$ ). Closer inspection of Table 5 indicates that the bilingual children performed less well than their monolingual counterparts. The results also showed a significant effect of

TABLE 5. *Bilingual and monolingual groups' picture naming scores across three assessments*

Assessment 1	Bilinguals		Monolinguals	
	Mean (SD)	Range	Mean (SD)	Range
Total PN score /72	40.2 (10.2)	25–55	60.3 (7.1)	50–71
Matched /18	11.9 (2.7)	7–17	16.1 (1.1)	15–18
Cognates /18	11.4 (2.7)	6–15	14.7 (1.7)	12–17
Phrasal nouns /18	7.8 (3.3)	2–13	15.4 (2.5)	12–18
Holonyms /18	9.1 (3.0)	3–13	14.2 (2.7)	11–18
Assessment 2				
Total PN score	50.0 (7.9)	37–63	66.1 (2.8)	61–70
Matched	15.2 (2.1)	13–18	17.0 (0.9)	16–18
Cognates	13.7 (3.8)	10–16	16.1 (1.2)	14–17
Phrasal nouns	11.4 (3.8)	5–15	16.6 (0.7)	16–18
Holonyms	9.4 (2.3)	6–18	16.3 (1.6)	14–18
Assessment 3				
Total PN score	59.4 (5.4)	49–67	69.6 (1.7)	67–72
Matched	16.9 (1.4)	14–18	17.7 (0.7)	16–18
Cognates	15.6 (1.0)	14–17	16.6 (0.5)	16–17
Phrasal nouns	14.1 (2.4)	9–17	17.6 (0.5)	17–18
Holonyms	12.9 (2.1)	9–16	17.2 (1.0)	15–18

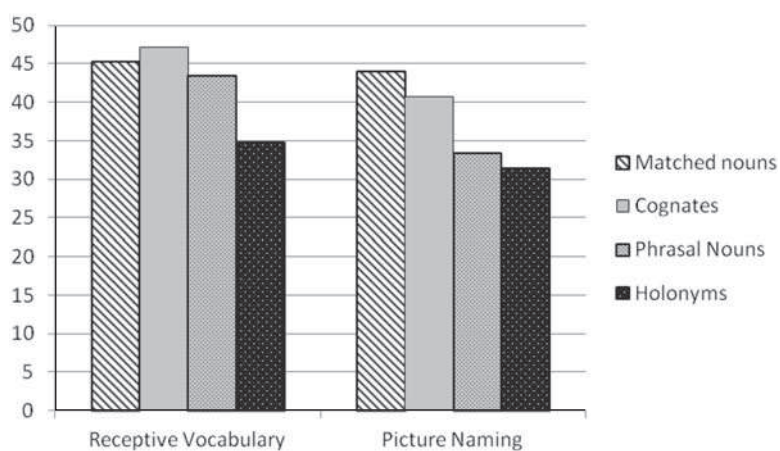


Fig. 2. Bilingual mean word type scores across three assessments.

assessment time ( $F(2,15)=44.49$ ,  $p<0.001$ ), with combined group scores improving over time. The interaction between group and picture naming scores over time was also significant ( $F(2,15)=6.508$ ,  $p=0.009$ ). This indicated that that each group's change over time varied.

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TABLE 6. *Picture naming scores according to group and word type (time 1 + time 2 + time 3)*

Word type	Bilinguals		Monolinguals	
	Mean (SD)	Range	Mean (SD)	Range
Matched words	44.0 (5.2)	34-50	50.8 (1.9)	49-54
Cognates	40.7 (4.8)	32-47	47.3 (2.7)	42-51
Phrasal nouns	33.3 (8.4)	20-45	49.6 (3.0)	45-54
Holonyms	31.4 (6.3)	23-41	47.8 (4.0)	42-53

Bonferroni-corrected *t*-tests (significance level  $p < 0.02$ ) indicated a significant improvement in performance on total vocabulary over time for both groups. For the monolingual group, picture naming scores significantly improved between Assessments 1 and 2 ( $t(8) = 3.339$ ,  $p = 0.01$ ) and again between Assessments 2 and 3 ( $t(8) = 5.149$ ,  $p = 0.001$ ). Similarly, the bilingual children's picture naming scores improved between Assessments 1 and 2 ( $t(8) = 5.549$ ,  $p = 0.001$ ) and also between Assessments 2 and 3 ( $t(8) = 5.425$ ,  $p = 0.001$ ). Table 5 suggests that the difference between the monolingual and bilingual groups' scores varied across the three assessment times in that the bilingual children's scores showed less difference to those of the monolingual group over time. At Assessment 1, the mean difference between the groups was 20.1, at Assessment 2, 16.1, and at Assessment 3, 10.2.

Table 5 indicates that pattern of performance between groups differed according to the type of words. Table 6 shows picture naming performance summed across assessments for each word type. A repeated-measures ANOVA on these data showed a significant group effect ( $F(1,16) = 31.870$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.666$ ), with the monolingual group achieving higher mean scores on all word types. Combined performance differed according to word type ( $F(3,14) = 20.077$ ,  $p < 0.001$ ). The interaction between group and word type was also significant ( $F(3,14) = 9.949$ ,  $p < 0.001$ ). As indicated in Table 6, the bilingual group's performance varied according to word type, whereas the monolinguals showed consistency of performance across word types.

Post-hoc Bonferroni-corrected ( $p < 0.008$  required for significance) paired-*t* testing confirmed that, apart from matched-cognate words ( $t(8) = 4.299$ ,  $p = 0.003$ ) the monolingual group performed no differently according to word type (phrasals-holonyms:  $t(8) = 2.604$ , n.s.; matched-phrasals:  $t(8) = 1.178$ , n.s.; matched-holonyms:  $t(8) = 2.268$ , n.s.; cognates-holonyms:  $t(8) = 0.512$ , n.s.; phrasals-cognates:  $t(8) = 2.295$ , n.s.). In contrast, only two comparisons were not significant for the bilingual group: matched-cognates ( $t(8) = 2.341$ , n.s.) and phrasals-holonyms were equally

difficult ( $t(8)=1.434$ , n.s.). Matched words elicited better performance than phrasal nouns ( $t(8)=6.102$ ,  $p<0.001$ ) and holonyms ( $t(8)=9.128$ ,  $p<0.001$ ). Cognates also were associated with better performance than phrasal nouns ( $t(8)=3.874$ ,  $p=0.005$ ) and holonyms ( $t(8)=4.954$ ,  $p=0.001$ ). These word type comparisons are shown graphically in Figure 2.

#### DISCUSSION

This study investigated word learning in typically developing sequential bilingual children, during their first eighteen months of school. Specifically, the study investigated patterns of L2 word learning across four word types: matched nouns, cognates, phrasal nouns and holonyms. The importance of phonological and conceptual distance between L1 and L2 word types was of particular interest. We hypothesized that L2 word types with phonological and/or conceptual similarity to L1 would be consolidated more easily into the L2 lexicon than words with phonological and/or conceptual difference. Results indicated rapid receptive and expressive vocabulary growth over time. Consistently, receptive scores were higher than expressive scores for both groups, although this pattern was more marked in bilinguals. Over time, the monolingual group demonstrated no differences in word learning according to word type. Conversely, significant differences across word types in the bilingual group suggested that L1 knowledge influences L2 lexical acquisition and consolidation. Of particular interest, conceptual distance appeared to be a stronger predictor of word learning than phonological distance, that is, L2 lexical items were acquired earlier if their conceptual representation was similar to that of L1. Words with greater conceptual distance between L1 and L2 were slower to emerge. We examine each of these findings in more detail below.

Given that the bilingual group received regular exposure to English at school during the study, we anticipated that L2 vocabulary would improve. Not surprisingly, assessment revealed significant improvements in receptive and expressive scores at each assessment point. Assessment also revealed improvements within each word type. This pattern is consistent with studies demonstrating rapid lexical growth in young children during early L2 exposure (e.g. Kan & Kohnert, 2005; Leseman, 2000; Schaerlaekens, Zink & Verheyden, 1995).

Comparison of monolingual and bilingual test scores provided evidence of rapid lexical growth in the bilingual group. In both the receptive vocabulary and picture naming tasks, scores showed progressively less difference between the bilingual and monolingual group scores over time. Despite this, however, the monolingual group performed significantly better than the bilingual group on both measures at all time-points. This result was expected, given the limited English exposure of the bilingual group.

Another expected result in the bilingual group was consistently higher scores in the receptive vocabulary task relative to the picture naming task. That is, children were able to show word knowledge for a greater number of words receptively than expressively. This pattern presented even though both tasks contained equal numbers of words selected from a high-frequency word set. Evidence of lexical consolidation appearing receptively before expressively is well documented in the literature (Hemsley *et al.*, 2006; Kohnert & Bates, 2002). Lexical representations are present but may be underspecified, limiting expressive retrieval and production.

Central to this study was the possibility that L1 knowledge facilitates word learning in L2. Specifically we proposed that the similarity of ‘new’ words to existing lexico-phonological representations would influence their uptake in L2 (Lindsay & Gaskell, 2010). To achieve this comparison, we developed English lexical tasks with equal representation of four cross-linguistic word types: matched words, cognates, phrasal nouns and holonyms. Each type demonstrated varying conceptual and phonological distance between L1 and L2. We expected that word types with conceptual/phonological similarity would show faster uptake than those with greater conceptual/phonological distance.

To ensure patterns were not associated with word differences in English, bilingual results were compared to those of a monolingual control group. As expected, monolinguals largely showed consistency of performance across word types both receptively and expressively. One unexpected statistical difference for the monolingual group was in picture naming between matched words and cognates at initial assessment. This difference did not appear in the bilingual group. Inspection of the monolingual children’s initial assessment data indicated that two participants performed poorly, probably because of the unfamiliar assessment context. In contrast to the monolingual group, the bilingual group presented many significant differences between word type scores. These related both to phonological and conceptual differences, which are presented, in turn, below.

#### *Phonological distance: a known advantage?*

Cognates demonstrate conceptual AND phonological similarity between L1 and L2. We expected that this would facilitate L2 learning, with faster neocortical consolidation than word types with greater conceptual or phonological distance (Costa *et al.*, 2000; Costa *et al.*, 2005; Lindsay & Gaskell, 2010). We predicted relatively higher cognate scores in both receptive and expressive tasks. On the contrary, a significant cognate advantage was only identified in the picture naming task. Given that vocabulary learning tends to appear receptively before expressively, the absence of this pattern receptively was, in hindsight, logical. Receptive

word learning scores were close enough to ceiling for a cognate advantage to have passed. Had the participants been assessed earlier in their English acquisition, we propose that the anticipated pattern would then have been discernible receptively, but perhaps not expressively. Further research with sequential bilinguals earlier in their L2 acquisition would confirm this suspicion.

The picture naming task revealed a cognate advantage. Cognates elicited significantly higher scores than phrasal nouns and holonyms. This is consistent with literature suggesting that cognates support L2 language abilities because they integrate more easily into the lexicon, resulting in faster and more accurate retrieval (Costa *et al.*, 2000; Costa *et al.*, 2005; de Groot *et al.*, 2002).

Of interest, there was no difference between cognates and matched words. That is, words with phonological similarity were no easier to learn than matched words (without phonological similarity). Conceptual similarity appeared more important here, a feature shared by both groups. This conceptual advantage was not anticipated. We suggest that conceptual distance between L1 and L2 may be of (at least) equal importance to phonological distance in facilitating word learning in sequential bilinguals.

#### *Conceptual distance: a new player*

Cognates, and phonological distance, are easily distinguishable dimensions for evaluating lexical acquisition in sequential bilinguals. Much less evident is the effect of conceptual distance: the way in which L1 conceptual representations affect L2 acquisition. Given that conceptual information is shared across languages (Kroll & Stewart, 1994; Kroll *et al.*, 2005), it makes sense that L1 conceptual representations could facilitate or inhibit L2 acquisition. Limited evidence suggests that conceptual distance can affect language processing and expression across languages (Carroll & Von Stutterheim, 1993). However, a greater understanding of transfer effects is “critically needed ... to inform educational practice and language intervention programs” (Kohnert, 2008: 78).

The current study deemed single words with the same meaning in English and Samoan to have conceptual similarity. This was seen in matched words (e.g. *spider* vs. *apogaleveleve*) and cognates (*pen* vs. *peni*). Conceptual distance was evident in two word types. Phrasal nouns described concepts represented by a single word in English (e.g. *shorts*) but a short descriptive phrase in Samoan (*ofu vae pupu'u*). Holonyms described two words in the English lexicon (e.g. *arm* and *hand*) represented by a single lexical item in Samoan (*lima*).

Phrasal nouns and holonyms were predicted to be the most difficult word types to acquire in L2. Both demonstrated conceptual AND phonological



distance between L1 and L2. This pattern was confirmed in the Picture Naming task. Both phrasal nouns and holonyms demonstrated significantly lower scores than matched words and cognates. Phrasal nouns and holonyms were equally difficult. These results confirm that cross-linguistic influence can be either facilitative or inhibitory. Further, conceptual distance appeared to determine this pattern. Words with conceptual similarity between L1 and L2 (cognates and matched nouns) demonstrated quick L2 consolidation. Conversely, words with conflicting conceptual representation between L1 and L2 (phrasal nouns and holonyms) appeared more challenging to acquire in L2.

This finding is not entirely unprecedented. In a discussion of language organization, Kellerman (1995) highlighted the problematic nature of conceptual differences between languages: “the search for correspondences, for an opportunity to *transfer to somewhere* is motivated by the existence of a particular disposition to view things that way” (p. 142). It seems that sequential bilinguals use existing language constraints and resources when developing new lexical footprints (Gaskell & Dumay, 2003). Words requiring a conceptual shift from L1 take longer to consolidate and strengthen within the L2 lexicon. Further research, including a range of language pairs, is needed to confirm these findings.

Holonyms presented the only statistically significant finding in the receptive task. This word type scored significantly lower when compared with matched words, cognates and phrasal nouns. It is possible this finding was a remnant of patterns more clearly identifiable in the expressive task because children establish receptive mental representations for words before they use them. It is also possible that holonyms have greater conceptual distance than phrasal nouns, making them harder to fossilize in the L2 lexicon.

#### CONCLUSION

This exploratory study investigated whether L1 influences L2 word learning in sequentially bilingual children. The importance of phonological and conceptual distance between L1 and L2 word representations was of particular interest. Results showed that the level of conceptual distance between L1 and L2 was a key factor in L2 lexical acquisition. That is, L2 lexical items were acquired earlier if their conceptual representation was similar to that of L1. Words with greater conceptual distance between L1 and L2 emerged more slowly. This suggests that L1 knowledge and resources influence L2 lexical consolidation for sequential bilinguals. Words that do not fit existing schemas, or require a conceptual shift from L1, take longer to consolidate and strengthen within the L2 lexicon.

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## APPENDIX – WORDS ACCORDING TO CATEGORY IN LEXICAL TASKS

### Receptive Vocabulary Task

*Holonyms*: foot–leg; hand–arm; jumper–jacket; couch–chair; watch–clock; grapes–sultanas; photo–picture; lamp–light; brush–comb

*1 to 1*: spider; rain; pig; box; duck; pillow; fork; fish; broom; house; boy; lounge-room; friends; tractor; game; child; milk; corn

*Compound words*: dress; fridge; playground; chicken; pyjamas; toes; cup; socks; postman; toothbrush; gloves; ladder; plane; juice; pram; shop; garage; motorbike

*Derived words*: bus; ice-cream; cupboard; chips; kangaroo; jelly; bucket; truck; koala; zip; bubbles; mop; tiger; carrot; blocks; glue; puzzle; cake

**Picture Naming Task**

*Holonyms*: foot–leg; hand–arm; jumper–jacket; couch–chair; watch–clock; grapes–sultanas; photo–picture; lamp–light; brush–comb

*I to I*: kite; moon; basket; soap; frog; ant; button; towel; pumpkin; teacher; bird; boat; policeman; flower; school; tummy; book; Dad

*Compound words*: present; camera; fire truck; glass; shorts; puppy; fingers; kitchen; fireman; doll; train; bike; toast; shirt; bedroom; shower; pool; tongue

*Derived words*: chocolate; sandwich; ball; possum; helicopter; strawberry; spoon; pizza; teddy; vacuum; truck; lion; key; rabbit; steps; telephone; bat; giraffe

## SECTION TWO:

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HOW CAN ASSESSMENT VALIDLY  
DIFFERENTIATE LANGUAGE  
DIFFERENCE FROM DISORDER IN  
AUSTRALIAN ESB CHILDREN?

# Chapter 4

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## Identifying language difference versus disorder in bilingual children

**Hemsley, G.,** Holm, A., & Dodd, B. (2014). Identifying language difference versus disorder in bilingual children. *Speech, Language and Hearing, 17*(2), 101-115.

## Preface

The year six study (Hemsley, Holm & Dodd, 2006: see Appendix 1) indicated that standardised tests should be avoided when assessing ESB children, even after six years of regular, consistent English exposure. Although other literature echoes this advice (e.g., De Lamo White & Jin, 2011; Laing & Kamhi, 2003) there is little agreement regarding the techniques and processes clinicians *should* use for discriminating language difference from disorder in ESB children. Many studies have investigated a single methodology that may be valid for use with ESB children (e.g. the composite scoring evaluation in chapter 2). Other documents provide guidelines for assessment and diagnosis of bilingual children but lack specific direction and examples for clinicians (e.g. Speech Pathology Australia, 2009).

Chapter 4 of this thesis draws together literature regarding bilingual language assessment and considers how speech-language pathologists can validly assess ESB children given limited time and resources for individual assessment. The study presents the cases of two school age ESB children. For each case, differential diagnosis is achieved using clinically feasible and culturally sensitive assessment techniques. The cases highlight essential standards for evaluating bilingual language development in an Australian context.

# Identifying language difference versus disorder in bilingual children

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Speech-language pathologists are frequently required to assess culturally and linguistically diverse children. Achieving culturally sensitive, valid, *and* clinically feasible assessment of children in this population can be challenging. Several assessment options are available; however, the literature lacks discussion around clinical reasoning and differential diagnosis using a combination of these options. This paper examines the use of a number of assessment techniques in combination for differentiating language difference from language disorder in early sequential bilingual children. In two cases, valid differential diagnosis is achieved by obtaining comprehensive information on each child's language learning context, then applying a range of culturally sensitive assessment techniques: peer-child comparison, composite scoring, and dynamic assessment. Two essential standards for evaluating bilingual language development are presented. First, formal tests used in isolation are insufficient for diagnosing specific language impairment in bilingual children: the use of alternative techniques is crucial. Second, diagnosis requires the implementation of a range of alternative assessment techniques. No single methodology provides a definitive conclusion of difference versus disorder. A range of assessments considered together, however, provide a strong body of evidence outlining a child's language abilities in their unique cultural context.

**Keywords:** Bilingual, Language, Assessment, Children, Language impairment

## Introduction

Culturally and linguistically diverse children represent an increasing proportion of speech-language therapy caseloads in the western world. Many of these children are early sequential bilingual (ESB). A minority language is the dominant and first language (L1) introduced to children at home. Regular exposure to English (L2) begins during the first five years of life, and often after three years of age at the commencement of childcare or school (Genesee, 1988; Kohnert and Bates, 2002; Macnamara, 1967). ESB language learners are not two monolinguals in one (Grosjean, 1982). Once a second language is introduced, the development of L1 and L2 follow different timelines and sequences to monolingual speakers of either language (Goldstein, 2004; Kohnert and Bates, 2002; Windsor and Kohnert, 2004; Bedore and Peña, 2008). This different trajectory of language development is frequently referred to as 'language difference' (Langdon, 1989).

Reports regarding the trajectory of L1 language development following the introduction of L2 are varied. Some studies report that L1 becomes unstable, causing development to stall or decline (Kan and

Kohnert, 2005; Lambert, 1975; Leseman, 2000; Wong Fillmore, 1991; Bedore and Peña, 2008). Other studies show equal growth of L1 and L2 (Rodríguez *et al.*, 1995; Winsler *et al.*, 1999). The amount and type of exposure to each language at home and school appear to produce these differing outcomes. In Australia and the UK, the highly diverse population means that ESB children often experience limited L1 community support and start school with few, if any, peers with a common L1. These factors reduce exposure to and support for developing the home language. Indirectly, these factors de-value L1 maintenance, which can result in L1 decline and/or a passive pattern of L1 use (where children understand L1 but have limited L1 expressive output) (Borland, 2006; Portes and Hao, 2002; Hemsley *et al.*, 2010). This is in contrast to nations with a dominant minority home language (such as Spanish in the USA) where there is strong community support for ongoing L1 development outside the home.

Research also suggests that timelines for L2 acquisition vary according to the language-learning context (Rydland *et al.*, 2013). In the United States, Spanish-English speaking children in some contexts have shown rapid L2 acquisition, allowing them to reach the language level of monolingual peers within five years (Hakuta *et al.*, 2000; Ramirez, 1992). However, most of the research indicates a longer

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timeframe. While ESB children can develop conversational proficiency (comparable to English monolingual peers) in approximately two years, they require 6–10 years of English exposure before they perform at the same level as monolingual peers in academic tasks (Cummins, 1981, 1984; Hakuta *et al.*, 2000). For example, an Australian study found that the English language abilities of ESB children in their seventh year of consistent English exposure remained significantly below that of monolingual peers (Hemsley *et al.*, 2006). Other studies have suggested that L2 learning in typically developing ESB children may take up to 13 years (Thomas and Collier, 1997).

These differences in bilingual language learning present a series of challenges for speech-language pathologists (SLPs) (Girolametto and Cleave, 2010). First and foremost, ESB children need to be assessed differently to monolingual children (Bedore and Peña, 2008; De Lamo White and Jin, 2011; Fredman, 2006). Unfortunately, the majority of SLPs report that they lack the theoretical knowledge necessary to provide appropriate assessment services to culturally and linguistically diverse children (Williams and McLeod, 2012; Caesar and Kohler, 2007). Specifically, ‘school based SLPs ... lack either the knowledge and experience or a clear methodological mandate as to how to proceed with the assessment of bilingual children’ (Caesar and Kohler, 2007).

There are also practical factors to consider in the assessment of ESB children. First, most clinicians are monolingual (Caesar and Kohler, 2007; Williams and McLeod, 2012; Jordaan, 2008). If both of a bilingual child’s languages are to be considered, interpreters will be required to assist with the assessment process. Unfortunately, access to and choice of interpreters can often be limited. Those available will have different levels of education and experience working with children, both of which may affect the assessment process. Secondly, in situations where the SLP does speak both of a child’s languages, there are often limited, if any, assessments available in the child’s first language. Finally, in a world where time is money, assessments are often allocated a set time for completion. This limits the option to consider use of a range of assessment techniques, as well as time available to coordinate interviews and assessments with an interpreter.

This paper evaluates appropriate assessment options for SLPs working with ESB children to enable them to validly differentiate language difference (a typical pathway toward bilingual competency) from language disorder (where a core deficit in language learning exists). The issue of clinical feasibility is considered: identifying techniques that are realistic for clinical SLPs with limited time and resources for individual assessment. Two case studies are presented that address two key questions:

1. Can standardized formal assessments provide useful information for differentiating language difference from disorder in ESB children?
2. Are there clinically feasible alternative assessment methods that provide useful information for differentiating language difference from disorder in ESB children?

### Formal assessments

Standardized tests are a typical starting point for monolingual language assessment. However, the standard scores these tests produce are only valid when the child matches the cultural and linguistic experiences of the standardization group (Gutiérrez-Clellen and Simon-Cerejido, 2009). ESB children generally bear little similarity to the standardization sample. Even after several years of consistent exposure to L2, limited and different experiences using L2 mean their language is not comparable to monolingual same age peers (Battle, 2002; Kohnert *et al.*, 2009; Laing and Kamhi, 2003). For this reason, formal assessments are universally accepted as diagnostically inadequate and inappropriate for differentiation of language difference from disorder (Caesar and Kohler, 2007; De Lamo White and Jin, 2011).

Professional practice guidelines advise against the use of formal (monolingual) assessments with ESB children (Fredman, 2006; Speech Pathology Australia, 2009; Royal College of Speech and Language Therapists, 2006; American Speech-Language Hearing Association, 2004). Despite this advice, SLPs in the United States and Australia continue to rely more on formal measures than alternative procedures when assessing culturally and linguistically diverse children (Caesar and Kohler, 2007; Williams and McLeod, 2012). Apart from the obvious reason that formal assessments are available and familiar, their continued use may reflect the purpose of assessment: to identify strengths and weaknesses in a child’s English language development. The range of items on these carefully designed tasks enables collection of a wide breadth of L2 performance data. Unfortunately these formal test standard scores lack sensitivity to evaluate language development in a bilingual child’s unique language learning context.

### Understanding bilingual backgrounds

Before assessing a bilingual child, description of the language environment and patterns of language use are essential (De Lamo White and Jin, 2011; Hammer *et al.*, 2004). Understanding the amount and type of exposure a child has to each of their languages provides a starting point for considering typical language development. It also enables informed assessment choice. The ‘unrestrained use of any assessment methodology without considering the cultural and linguistic status of a child presents the risk of incorrect diagnosis’ (Hemsley *et al.*, 2010).

ESB children with passive L1 use provide an example of how patterns of language use can impact on assessment choice. Passive bilinguals have good L1 receptive abilities, and can comprehend conversations with native L1 speakers, but shortly after L2 exposure begins their preference for speaking shifts to L2. Over time, these children maintain a sound understanding of L1, but expressive abilities decline (Borland, 2006; Pease-Alvarez, 2002; Hammer *et al.*, 2004). In this context, assessment of L1 expressive abilities could provide misleading information, and would be an inappropriate assessment choice. While L1 receptive language assessment may be appropriate, the assessment tasks need to be considered carefully. The use of less academic/formal tasks would be preferred, as many ESB children have not had academic instruction in L1.

### *Options for clinically feasible and valid bilingual assessment*

Once a thorough profile of the language learning context has been established, a range of alternative assessment options are available for ESB children. Regrettably, limited training and experience means that many SLPs feel 'neither competent nor confident' in their administration (Caesar and Kohler, 2007). When they can be used, such assessments greatly assist the SLP in differentiating language difference from language disorder. These approaches include peer-child comparative analysis (PCCA), composite scoring, and dynamic assessment. While other assessment approaches are available, the measures described here have the advantage of clinical feasibility in a setting where the SLP speaks only English. While the use of an interpreter is still an important part of this process, their input is limited to shorter, structured tasks including parent interviews and vocabulary testing.

### **Peer-child comparative analysis**

PCCA evaluates a child's language abilities in their unique bilingual context. It compares the language skills of a child suspected of language disorder with the language skills of a family member or 'typically developing' peer from the same cultural and linguistic background (Thomas and Hand, 2004; Hemsley, 2006; Terrell *et al.*, 1992; Wyatt, 2001). This technique has limited validation because the criterion reference is a single person. However, the similarity of linguistic experiences between the target child and the comparison child reduces the risk of drawing 'unwarranted conclusions about disorder when a child produces a non-standard response' (Hand, 2000).

### **Composite scoring**

This methodology investigates lexical development by administering a vocabulary assessment in both L1 and L2 (Pearson *et al.*, 1993; Hemsley *et al.*, 2010). Lexical composition is calculated by counting the total

number of lexical items correctly identified or labeled across the two languages. Several studies highlight the validity of composite scoring (also known as conceptual scoring) as an accurate measure of the bilingual lexicon (David and Li, 2005; Hemsley *et al.*, 2010; Kan and Kohnert, 2005; Marchman and Martinez-Sussmann, 2002; Peña *et al.*, 2002). Bilingual composite scores have the advantage of being comparable to monolingual scores (Hemsley *et al.*, 2010; Pearson *et al.*, 1993). This increases the diagnostic power of this technique, allowing SLPs to make clinical judgments regarding the lexical abilities of bilingual children (Bedore and Peña, 2008).

### **Dynamic assessment**

Dynamic assessment is a well-established and valid technique for measuring the language skills of children from bilingual backgrounds (e.g. Gillam *et al.*, 1999; Gutiérrez-Clellen and Peña, 2001; Gutiérrez-Clellen, 2000). Rather than a static measure of language ability, dynamic assessment evaluates a child's language learning potential. There are several types of dynamic assessment. The method best able to discriminate language difference from disorder is the 'test-teach-retest' format, which takes place over a number of weeks (Gutiérrez-Clellen, 2000; Gutiérrez-Clellen and Peña, 2001; Miller *et al.*, 2001). Interactions can take place in the child's second language, which is also a significant advantage for monolingual SLPs. The examiner obtains baseline data by testing a specific area of language weakness. A small number of intervention sessions are then provided in the target area (usually up to three). Following intervention, re-administration of the baseline task evaluates the child's ability to learn and generalize target skills.

Two diagnostic measures produced during dynamic assessment provide a powerful tool for the SLP working with ESB students. First, post-test scores offer a valid indicator of a student's ability to learn and apply new skills and strategies (Gutiérrez-Clellen and Peña, 2001). Second, measures of student behaviors (obtained during the intervention phase) are highly predictive of language impairment in students (Peña *et al.*, 2007, 2006, Ukrainetz *et al.*, 2000). For example, ratings on just two dimensions of a learning behavior questionnaire (metacognition and flexibility) differentiated typically developing from language disordered bilingual students with over 90% accuracy (Peña *et al.*, 2007).

### **Case studies**

The following case studies examine two ESB children, Luka and Antony. Language assessment was completed to determine whether specific language impairment (SLI) was an appropriate diagnosis. SLI is diagnosed where severe language difficulties do not have a physical, sensory, or cognitive basis (American Psychiatric Association, 1994; Kohnert *et al.*, 2009). Assessment

established whether the children's language skills were consistent with underlying SLI, or whether differences in their language skills were characteristic of ESB language development. In an ideal world, the use of English standard scores is not recommended for bilingual children; however, they do continue to be used by clinical SLPs (Williams and McLeod, 2012; Caesar and Kohler, 2007). In this context, we report the standard scores then critically analyze their value in differentiating language difference from disorder in the cases presented.

### Case 1: Luka

Luka is of Samoan heritage. He is 11 years old and lives with his paternal grandparents, parents, siblings, and cousins. Luka is the youngest person living in his home. He has two older brothers (aged 17 and 20 years) and one older sister (aged 15 years). Three cousins (from Samoa) have lived with the family for several years: two males (aged 20 and 23 years) and one female (aged 18 years). None of Luka's siblings have reported communication difficulties.

Luka's parents were born and educated in Samoa, but moved to Australia in their early twenties. Both parents are native speakers of Samoan, but are also competent in English, their language of education during secondary school. Luka's father is a carpenter and his mother stays at home to care for the family. Luka's birth and medical history were without incident. His developmental milestones were age appropriate, with no history of middle ear dysfunction or hearing difficulties. His parents noted that they were not concerned about Luka's language development at home, but were aware that school was 'difficult' for their son and wondered if this was because learning English was hard for him. Luka's parents actively encourage their children to maintain strong Samoan cultural and linguistic links. Their suburb has an active Pacific Island community, with many Samoan friends and family members nearby. They are members of local Samoan church and sporting groups. The family also visits Samoa at least twice each year. Each summer, the family spends 8–10 weeks in Samoa living with family and friends.

Maintenance of the Samoan language is valued and encouraged within Luka's family. Samoan has consistently remained the primary language used at home. Regular exposure to English began when Luka started school. Luka's parents always use Samoan with each other and their children. The children are expected to respond in Samoan. Minimal code-switching is accepted, depending on the situation. During mealtimes and family activities the family predominantly uses Samoan. However, when interacting casually at home, Luka and his siblings usually use English. In contrast, Samoan is only used when speaking with Luka's grandparents (who do not speak English) and at church.

### Educational setting

Luka is currently in year 7. He started preschool at his local school at 4;6 years and has remained at this school throughout his primary education. Census data identify this area as one with low socio-economic status: the Index of Relative Socio-economic Advantage and Disadvantage ranked the suburb at the 23rd percentile (Australian Bureau of Statistics, 2006). Luka's school is characterized by high cultural and linguistic diversity. English is a second language for 85% of students. Most of the bilingual students at Luka's school have a Pacific Island heritage. The students are predominantly ESB: a language other than English is dominant within the home, and children have limited English exposure prior to starting school. For Luka, preschool provided his first regular and consistent exposure to English at four years of age.

### History of language support

An SLP initially assessed Luka's language when he was in year 6 (10;11 years). Language difficulties were reported following administration of the Clinical Evaluation of Language Fundamentals – fourth edition (CELF-4) (Semel *et al.*, 2006). Subsequently, Luka participated in a school program over nine months. He attended twice weekly sessions with a teacher's aide. Intervention targeted concept development and vocabulary growth. The SLP joined sessions once a month to monitor progress and provide additional materials and training. The SLP reported 'small steps' toward mastery of targeted skills over the intervention period. Luka's language was reviewed using the CELF-4 in year 7 (11;8 years). Luka's profile of change over the assessment period was limited (see Table 1). He obtained small raw score gains in two subtests. In other areas, Luka's raw scores declined.

The following factors led the school support team to consider a diagnosis of SLI:

**Table 1** Luka's CELF-4 results at age 10;9 and 11;8 years

Age	10;9 years		11;8 years	
	Raw score	Standard score	Raw score	Standard score
Subtest				
Concepts and following directions	42	5	45	6
Recalling sentences	36	4	32	3
Formulated sentences	35	6	27	3
Word classes (receptive)	6	5	8	1
Word classes (expressive)	2	4	2	1

Note: Monolingual standard scores are reported for accurate case presentation only: they do not reflect Luka's language abilities accurately as his linguistic experiences do not match those of the standardization sample.

- Formal tests suggested little progress in English language learning;
- Classroom work samples, assessment tasks as well as anecdotal information collected from the class teacher indicated ongoing difficulties with language-related academic tasks;
- Psychometric testing ruled out a cognitive basis for language concerns, with non-verbal language abilities well within the average range; and
- There were no sensory deficits: hearing and vision were found to be within normal limits.

Because of Luka's bilingual background, it was acknowledged that formal language tests did not provide a valid indicator of his language abilities. Luka was actively bilingual, and it was possible that difficulties in the classroom were associated with typical bilingual language development. If a language disorder did exist, the extent of these difficulties was unknown. An accurate differential diagnosis required further assessment.

### Assessment results

PCCA and dynamic assessment results are presented. Luka was 11;8 years at the time of assessment.

### Peer-child comparative analysis

Further information regarding Luka's English development in his particular bilingual context was achieved using PCCA. This technique compared Luka's language skills with those of a peer from the same cultural and linguistic background with typical language development (Thomas and Hand, 2004; Wyatt, 2001). The high number of Samoan-English bilinguals at Luka's school allowed selection of a comparison child in the same grade and of approximately the same age (age 11;4 years). Parent questionnaires indicated a well-matched cultural and linguistic history. The peer was described by his teacher as having 'typical' language development when compared with other sequentially bilingual students in the class.

When completing PCCA, it is not necessary to compare the target child and peer on an entire test battery. One or two tasks are usually selected for rigorous comparison in areas of concern. In this case, Luka and his peer were assessed using a narrative task (Simon, 1987). Four line drawings were presented with a story title. Both students were asked to tell the best, most detailed story they could. Unlike the range of discrete CELF-4 tasks, this assessment involved a single, functional task that provided a holistic view of Luka's language. The resulting narrative samples (see Appendix A) were analyzed and compared. Valid indicators of school age language ability were selected for investigation: productive output, t-unit structure, and sentence quality (Justice *et al.*, 2006). Results are outlined in Table 2.

The productive output of Luka and his peer was remarkably similar. Both produced a comparable

**Table 2** Narrative analysis for Luka and a matched peer

	Luka	Peer
Total number of t-units	11	11
Total number of words	81	87
Average t-unit length (words)	7.4	7.9
% t-units containing 1 clause	82	73
% t-units containing 2+ clauses	18	27
Subordination Index	1.2	1.1
% t-units containing coordinating conjunctions	45	36
% t-units containing subordinating conjunctions	18	9
% t-units containing grammatical errors	27	9

number of t-units and words, resulting in the peer having a t-unit length only slightly above that of Luka. Similar patterns in t-unit structure were also observed. Both students predominantly produced single clause utterances resulting in comparable subordination index scores. Luka used more coordinating and subordinating conjunctions (and; then; but; because; when) than his peer (and; then; so; when); however, the ratios were similar. Analysis of grammatical errors for Luka and his peer found that both demonstrated the same types of errors, characterized by inconsistent use of irregular verb and pronoun markers. Errors with morphological markers and unstressed words (e.g. pronouns and auxiliary verbs) are common in children learning a second language (Owens Jr, 2008). Although Luka had more errors than his peer, these did not dominate his narrative and would not be considered an indicator of impairment.

### Dynamic assessment

Dynamic assessment provided information regarding Luka's language learning style and response to therapy. This occurred over six weeks: in week 1 Luka was assessed; in weeks 3 and 4 he received two intervention sessions; then in week 6 he was reassessed.

Luka's class teacher reported that Luka experienced difficulty expressing ideas in complete sentences. Subsequently, this area was selected as a target for dynamic assessment. Two assessments were used to obtain baseline data: the Formulated Sentences subtest of the CELF-4 and the narrative sample produced in PCCA. Baseline data analyses indicated that Luka used conjunctions in the PCCA narrative task. In the Formulated Sentences task, however, his complex sentence and conjunction use was minimal. It appears that during the more prescriptive, structured task Luka found it difficult to use complex linguistic structures. For this reason, the use of complex sentences containing joining words (conjunctions) was selected as the goal for intervention. Importantly, intervention did not 'teach the test': the test items, test materials, and test format were not used in intervention. Instead, sessions developed awareness of the target skill and strategies to facilitate its use. These were practised and reflected on using real-life examples.

### Intervention phase

Intervention was provided over two 45-minute sessions with the SLP. Each session followed the same protocol, including essential elements for a ‘mediated learning experience’ (for a full discussion of this, see Miller *et al.*, 2001; Gutiérrez-Clellen and Peña, 2001). At the beginning of each session, the clinician explained the goal of intervention:

*In last week's test I learned lots about your talking and listening. One thing that was difficult for you was using long sentences... sentences with two parts. If we spend a few weeks learning to use longer sentences it could really help you at school. We are going to practise making long sentences with two parts. We're going to glue the parts together with special joining words.*

The practical importance of the goal was then discussed. The value of using longer sentences in the classroom was a particular focus:

*When you're in high school you really need to use long sentences to explain your ideas. You need to use them when you are writing. You need to use them when you answer questions in the classroom. You really need to use long sentences to impress your teacher when you give a talk in class. They are really important!*

Next, Luka worked through examples of turning two short (written) sentences into one longer sentence. A list of joining words was used to select an appropriate word to ‘glue’ sentences together. To ensure links to ‘real life’, examples were drawn from Luka’s classroom:

*Let's answer a question your teacher might ask about marsupials. If he said 'Tell me something the same and something different about the koala and the kangaroo' what could you say? (Clinician scribes 'The koala and kangaroo both have pouches. Only the koala has two thumbs.') Do you think the teacher would be more impressed with two short sentences or one long sentence? Ok... lets choose a joining word to make one long sentence.*

The session concluded with a review of the goals of the session, the skills learned, why the target skill would help classroom performance and strategies for remembering new skills.

**Re-test:** Over time, Luka responded to explicit teaching by not only learning the target skills but also by applying them in untrained test activities. Two weeks following the intervention phase the Formulated Sentences subtest of the CELF-4 was readministered. Luka’s raw score increased considerably, from 25 to 47. Similar improvements were noted in Luka’s narrative. Table 3 indicates that Luka used more words and longer sentences on

**Table 3** Luka’s narrative analysis: pre- and post-dynamic assessment intervention

	Pre-intervention	Post-intervention
Total number of t-units	11	10
Total number of words	81	108
Average t-unit length (words)	7.4	10.8
% t-units containing 1 clause	82	50
% t-units containing 2+ clauses	18	50
Subordination index	1.2	1.5
% t-units containing coordinating conjunctions	45	50
% t-units containing subordinating conjunctions	18	40
% t-units containing grammatical errors	27	40

retest. His improved subordination index reflected a 32% increase in t-units containing 2+ clauses, and a corresponding increase in the use of subordinating conjunctions. The longer, more complex sentences allowed Luka to convey more information and detail than in his initial narrative:

*And then the girl looked at it and then went out the back in the kitchen to get the broom.*

*And then when the girl got the broom she was confused where was the cookies.*

Areas not targeted in intervention did not improve: a significant proportion of grammatical errors and disruptions remained or increased, possibly because increased sentence length and complexity amplified the language load during this task. Behavioral measures obtained during dynamic assessment are also highly predictive of language impairment. Luka’s learning behaviors were rated using a questionnaire developed by Peña, *et al.* (2007). His low scores (indicating better performance) in all areas were not compatible with SLI. For example, the survey highlighted Luka’s attentive and cooperative approach to learning. Although he required some feedback he remained interested in tasks and persisted despite difficulties. The questionnaire also identified many positive cognitive attributes. For example, Luka was able to recall the purpose of intervention and describe a complex sentence by the beginning of the second session: ‘*We talked about my short sentences... and turning two smaller sentences to make one long sentence which is called something... a complex sentence. You have to glue them together with a word.*’ A systematic and efficient approach to problem solving was also demonstrated in his ability to talk tasks through using a range of strategies to achieve success.

### Summary of Luka’s language abilities

Luka’s formal assessment results suggested limited English growth over a 12-month period. Evidence of

decline on several formal tasks was of particular concern. Despite this, Luka's language profile was not consistent with SLI. The completion of PCCA and dynamic assessment provided a more complete picture of Luka's language abilities. PCCA suggested that his language skills were consistent with a 'typically developing' peer: the overall picture was not one of SLI. Dynamic assessment confirmed this conclusion when Luka demonstrated an ability to learn language with limited support. Further, his learning behaviors (observed during dynamic assessment) were consistent with typical language development: able to 'effectively... take advantage of input in the environment to develop efficient language, on par with other children who have similar language experiences' (Windsor and Kohnert, 2004).

### Case 2: Antony

Antony is of Vietnamese heritage. He is 8 years old and lives with his parents and three siblings. He has an older brother in year 5, a younger sister in year 2, and a younger brother who is not yet at school. Antony's grandmother visits the home most days to help care for Antony and his siblings (after school) while their parents are at work.

Antony's parents were born and educated in Vietnam and are native Vietnamese speakers. They immigrated to Australia in their late teens. Although they both speak some English, Antony's parents describe their English skills as 'not fluent'. Antony's father works as a laborer and his mother works part-time in a factory. Antony's birth and developmental milestones were described as normal. Antony had no serious illnesses requiring hospitalization. He has no history of middle ear infections. He was described as late to start using words (between 2 and 3 years) and did not put words together until he was 3 years of age (shortly before initial exposure to English). Antony's family has maintained strong cultural and linguistic links to their Vietnamese heritage. They are part of a strong Vietnamese community that allows them to access many basic services in Vietnamese (doctors, shops, etc). The family attends a local Vietnamese church and has many Vietnamese friends. They return to Vietnam for a long visit (6–8 weeks) approximately once every two years.

Maintenance of the Vietnamese language has been encouraged within Antony's family. Vietnamese was the only language used at home during Antony's early years. Regular exposure to English began for Antony when he commenced childcare at nearly four years of age. Vietnamese remains the primary language used by Antony's parents and grandmother at home. When communicating with their children, both parents reported that they use mostly Vietnamese, with some English. Despite this

dominance of Vietnamese, Antony reportedly becomes confused when listening to this language. Antony's older brother frequently translates important information and instructions from Vietnamese into English to maximize comprehension. Since starting school, Anthony has exhibited an increasing preference for using English at home. His sentences often contain English and Vietnamese components mixed together, with frequent code switching. As Antony's grandmother does not speak English, communication with her is entirely in Vietnamese.

### Educational setting

Antony is currently in year 3 at his local state school. He started at 5;4 years and has only attended this school. Census data identify this area as one with low socio-economic status: the Index of Relative Socio-economic Advantage and Disadvantage ranked the suburb at the fifth percentile (Australian Bureau of Statistics, 2006). Antony's school has a strong multicultural presence with 70% of students being bilingual. Indigenous Australian, Samoan, and Vietnamese cultural backgrounds dominate. Like Antony, the majority would be described as ESBs: with a language other than English being dominant within their homes, and limited English exposure prior to starting school.

### History of language support

An SLP initially assessed Antony when he was in year 2 (age 7;5 years). Language difficulties were suggested following administration of the CELF-4 (Semel *et al.*, 2006). Subsequent small group intervention was provided for 12 months. Fortnightly sessions with the SLP were complemented by a school program administered by a trained teacher's aide. Therapy targeted vocabulary and sentence structures relating to class themes and topics. The SLP noted limited gains as well as patterns of language development associated with disorder: persistent use of telegraphic sentences (e.g. 'girl eating') despite focused intervention targeting simple sentence structures; frequent naming errors and word finding difficulties.

Antony's language was reviewed using the CELF-4 in year 3 (8;6 years). Antony's raw scores improved in some areas (see Table 4). Anecdotal evidence obtained during therapy, as well as analysis of the types of errors Antony made, led the SLP to conclude that gains on formal tests were not sufficient to rule out language difficulties.

The following factors led the school support team to consider a diagnosis of SLI:

- Although some gains were noted on formal tests, Antony's family, SLP, and school staff continued to have concerns regarding overall language development;

**Table 4** Antony's CELF-4 results at age 7;5 and 8;6 years

Age	7;5 years		8;6 years	
	Raw score	Standard score	Raw score	Standard score
Concepts and following directions	9	1	16	1
Recalling sentences	6	1	14	1
Formulated sentences	3	1	10	1
Word classes (receptive)	18	9	16	6*
Word classes (expressive)	3	1	11	6*
Sentence structure	17	3	17	1
Expressive vocabulary	9	1	18	2

Note: Monolingual standard scores are reported for accurate case presentation only: they do not reflect Antony's language abilities accurately as his linguistic experiences do not match those of the standardization sample.

\*On repeat testing, Antony was older than the maximum age for this task of the CELF-4. To achieve internal comparison, scores were extrapolated for the maximum age (aged 7;11years).

- Classroom work samples, assessment tasks as well as anecdotal information collected from the class teacher indicated ongoing difficulties with language-related academic tasks;
- Psychometric testing ruled out a cognitive basis for language concerns, with non-verbal language abilities well within the average range; and
- A developmental pediatrician ruled out a medical basis for language concerns.
- There were no sensory deficits: hearing and vision were found to be within normal limits.

Because of Antony's bilingual background, it was acknowledged that formal language tests did not provide a valid indicator of his language abilities. It was possible that difficulties in the classroom were associated with typical bilingual language development. If a language disorder did exist, the extent of these difficulties was unknown. An accurate differential diagnosis required further assessment.

### Assessment results

A language assessment was completed with Antony at age 8;6 years. Assessment took place over several sessions. Sibling comparison, composite scoring, and dynamic assessment results are reported.

### Peer-child comparative analysis

To obtain further information regarding Antony's L2 abilities in his unique bilingual context, PCCA was considered. Unfortunately, it was not possible to find a suitable peer from a comparable linguistic background. As an alternative, Antony's younger sister, Tammy, was selected as a comparison child. Tammy,

**Table 5** Comparative CELF-4 results for Antony and his sister

Age	Antony 8;6 years		Tammy 7;2 years	
	Raw score	Standard score	Raw score	Standard score
Concepts and following directions	16	1	36	10
Formulated sentences	10	1	16	7
Sentence structure	17	1	21	8

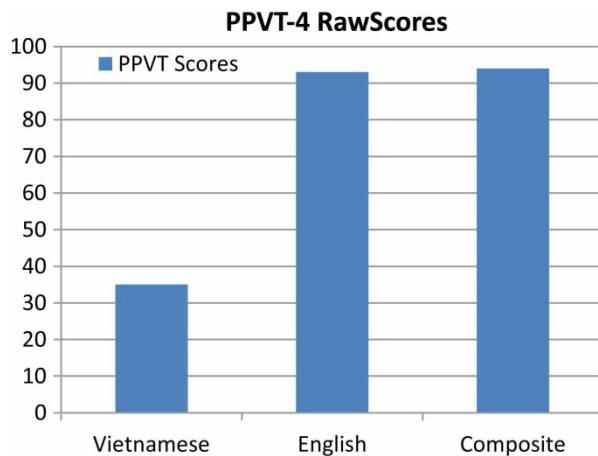
Note: Monolingual standard scores are reported for the purpose of between-student comparison. They do not reflect either student's language abilities accurately as linguistic experiences do not match those of the standardization sample.

16 months younger than her brother, was a year below him at school. However, her cultural and linguistic experiences were identical, making her a valuable comparison. Both children heard Vietnamese at home when talking with their parents. Although Vietnamese continues to be the dominant language spoken at home, both children may have benefited from English exposure at home with their older brother. Tammy was described by her class teacher as having 'typical' language compared with other sequentially bilingual peers in her class. Her academic results were described as average when compared with other ESB children in the class.

Three subtests of the CELF-4 were administered to Tammy. A summary of Antony and Tammy's test scores are reported in Table 5. Despite the age difference, Tammy scored considerably better than Antony in each of the subtests administered. Although Tammy had less exposure to English at school, she understood and used many concepts and grammatical structures that Antony could not use. Further, Antony's raw scores in year 2 (age 7;5 years) were well below those achieved by his sister at 7;2 years.

### Composite scoring

Further information regarding word level comprehension was obtained using the Peabody Picture Vocabulary Test: fourth edition (Dunn and Dunn, 2007). This test was administered across both of Antony's languages to allow investigation of his overall lexical composition using composite score methodology (Pearson *et al.*, 1993; Hemsley *et al.*, 2010). The test was initially administered in Vietnamese, then two weeks later in English. The Vietnamese test was completed by a Vietnamese-speaking teacher at Antony's school. Before testing, the teacher was trained in administration of the test, with Vietnamese equivalents for each of the PPVT vocabulary items decided and recorded. The SLP was present during test administration. Antony obtained a raw score of 93 in English and 35 in



**Figure 1** Antony's cross linguistic Peabody Picture Vocabulary Test: fourth edition scores

Vietnamese. As is shown in Fig. 1, a composite score was then calculated by awarding a single point for each item Antony identified, independent of language. This resulted in a composite raw score of 94 and a standard score of 74. The literature suggests that ESB children with typically developing language produce composite scores comparable with monolingual peers (Hemsley *et al.*, 2010; Pearson *et al.*, 1993). Antony's composite score was well below this mark. His English dominance meant that the addition of Vietnamese data made little difference to his overall composite score (see Fig. 1). Given that Vietnamese remains the primary language spoken in Antony's home, his limited understanding of common Vietnamese words was of concern.

Calculation of the number and proportion of singlets (words known in just one language) versus translation equivalents (words known by Antony in both languages) was also completed. Antony presented with 60 singlets (78%), of which 59 were English. This result confirmed Antony's English dominance. Of the 95 words tested, 34 translation equivalents were identified (22%). This pattern of development was unusual. Generally, ESB children with less than two years of L2 exposure present with high proportions of L1 singlets (Hemsley *et al.*, 2010; Kan and Kohnert, 2005; Peña *et al.*, 2002). Older children, like Antony, present with higher proportion of translation equivalents (Peña *et al.*, 2002). Failure to develop increasing proportions of translation equivalents may be evidence of language disorder (Hemsley *et al.*, 2010).

### Dynamic assessment

Information regarding Antony's language learning style and response to therapy was obtained using Dynamic Assessment procedures. This was completed over four weeks: in week 1 Antony was assessed; in weeks 2 and 3 he was given a short period of intervention; then in week 4 he was reassessed. Antony's difficulty in following directions greatly affected his

classroom participation. Following directions, therefore, was selected as an appropriate area for evaluation using dynamic assessment. The Concepts and Following Directions subtest of the CELF-4 was used as baseline data. Item analysis on this subtest enabled formulation of an appropriate intervention goal: the ability to retain and follow both elements of a two-part instruction. Intervention did not include the test items, test materials, or the test format. Instead, sessions developed awareness of the target skill and strategies to facilitate its successful use following a 'mediated learning experience' protocol (Gutiérrez-Clellen and Peña, 2001; Miller *et al.*, 2001).

### Intervention phase:

Intervention was provided over two 45-minute sessions with the SLP. At the beginning of each session, the goal of intervention was explained:

*Do you know what an instruction is? (when someone gives you something to do). You were good at following instructions when I gave you ONE thing to do... like this one (give example). But, some instructions were really tricky... ones where I gave you TWO things to do. Sometimes you only listened to one of the instructions... not two. Sometimes you listened but forgot what I said (show examples). We're going to spend a few weeks learning to listen to instructions with TWO things to do. Listening, remembering and then following the instruction! Let me show you using pictures...*

Next, the value of the goal was discussed in relation to classroom and playground activities:

*At school you have to follow instructions ALL the time! Can you tell me some people who give you instructions? Their instructions are really important... they help you to know what to do. What happens if you forget an instruction? (illustrate answers on one side of page: you do the wrong thing; you might miss out on something; your teacher gets frustrated; you get upset). Instructions are really important! If you remember instructions (draw consequences on other side of page) you'll do the right thing, you won't miss out, your teacher will be happy and you'll be happy too.*

Real-life examples of following two-part instructions were then rehearsed. Prompting was provided as necessary. In Antony's case this involved slowed presentation of instructions, clear division of the two parts of an instruction using hand signals (parts 1 and 2), repeating instructions twice, and using visuals to support instructions (e.g. pointing to the relevant parts of a worksheet when giving the instruction,



'Don't finish all these questions ... just do up to number eight'). At the end of each session, time was spent reviewing the goals and purpose of the lesson. This important segment ensured Antony understood what skills he had learned, how they might help him in the classroom, and strategies for remembering the new skills through the week.

*Re-test:* Following intervention, Antony's skills were again assessed using the Concepts and Following Directions subtest of the CELF-4. Antony presented with a profile of limited change over the dynamic assessment period: his raw score increased from 16 to 20. Measures of learning behaviors are an important part of dynamic assessment. These were rated during intervention using a simple questionnaire (Peña *et al.*, 2007). Antony demonstrated high scores (indicating the greatest difficulty) in three areas. A high Verbal Mediation score (4) indicated that Antony had difficulty planning and identifying problems, resulting in a disorganized, haphazard approach to tasks. His meta-cognition score (4) highlighted a lack of awareness of performance and errors during tasks. Flexibility was also limited, with restricted use of strategies without prompting (score 4.5). High scores on the latter two measures (in combination) are highly predictive of language impairment in students Antony's age (Peña *et al.*, 2007).

Antony demonstrated more positive social-emotional learning behaviors. He demonstrated high levels of enthusiasm and engaged in tasks readily. The tasks, though challenging, did not result in anxiety or distress. He responded well to feedback and encouragement to keep trying. Despite this, Antony required significant time and support to complete target activities. Signed prompts to identify two elements in an instruction and verbal prompts to repeat them back were unable to be withdrawn over the intervention period. In over 50% of instructions, clarification of instruction content was also necessary. The following examples highlight Antony's difficulties in processing instruction content.

---

SLP: Answer all these questions then come and show me your worksheet  
 Antony: what do you need to do?  
 Antony: Do all questions and show it to me  
 SLP: Who do you have to show it to?  
 Antony: Me

SLP: Antony, don't answer all these sums... just do up to number eight  
 What do you need to do?  
 Antony: Not all questions. Just two and eight.

---

### *Summary of Antony's language abilities*

Antony's profile was consistent with a diagnosis of SLI. Despite typical cognition, sensory, and physical

development, his language development was severely impaired. This was evident across all alternative assessments administered. PCCA indicated that Antony's performance across a number of tasks were significantly below those of a younger sibling. Composite scores highlighted limited L1 vocabulary development, and limited development of TEs. Antony also demonstrated limited change in areas targeted for intervention over the dynamic assessment period. Observation of Antony's learning behaviors during dynamic assessment produced a profile consistent with a significant difficulty in learning and acquiring language.

### **Discussion**

This study assessed two ESB school age children with a history of speech-language therapy support. Assessment aimed to distinguish language difference (language features characteristic of typical ESB development) from language disorder. Valid differential diagnosis requires a range of culturally sensitive assessment techniques (Kohnert, 2010). The alternative techniques used for assessment in this study were selected for their clinical feasibility in a setting where the SLP only spoke English: PCCA, composite scoring, and dynamic assessment. The battery of assessments clearly differentiated the two children suspected of having a SLI (see Table 6). Assessment revealed that Antony's language profile was consistent with SLI while Luka's was not.

### *Formal assessment confusion*

Despite professional practice guidelines advising against the use of formal assessments with bilingual children, a high proportion of SLPs continue this practice (Williams and McLeod, 2012; Caesar and Kohler, 2007). In both cases presented, there was a history of language assessment using formal tests. Although SLPs noted that standard scores were not an accurate measure of overall language abilities, subtest analysis was used to provide a profile of English language strengths and weaknesses and assist with development of intervention goals.

Beyond providing baseline data and direction for intervention, the formal tests used in these case studies produced more questions than answers. Both Luka and Antony demonstrated limited growth in L2 language abilities over time. Luka also demonstrated a decline in scores on several subtests. Whether this was the result of limited and different experiences using L2 or evidence a true language disorder was unknown. Limited growth in scores related to intervention targets was also difficult to interpret: evidence suggests that children can acquire language skills in intervention without a corresponding change in standardised test performance (Haynes and

**Table 6** Profile summary for Luka and Antony

L1	Luka Samoan (ESB)	Antony Vietnamese (ESB)
Reason for referral	Suspected of SLI	Suspected of SLI
Non-verbal skills	Average range	Average range
Formal test results	Limited raw score changes over 12 month period, with some areas of raw score decline	Limited raw score changes over 12 month period
PCCA	Not able to discriminate whether this was due to language difference or disorder <b>Typical:</b> length and complexity similar to typically developing peer	Not able to discriminate whether this was due to language difference or disorder <b>Atypical:</b> concept knowledge, sentence understanding and expressive skills significantly below younger sibling
Dynamic assessment	<b>Typical:</b> significant change over dynamic assessment period. Learning behaviors not consistent with SLI	<b>Atypical:</b> limited change over dynamic assessment period Learning behaviors consistent with SLI
Composite scores	NA	<b>Atypical:</b> limited L1 receptive vocabulary; L2 better than L1 but limited; composite score not greater than individual language scores
Conclusion	Profile consistent with typical ESB development	Profile consistent with SLI

Pindzola, 2008). Formal test scores therefore provided no concrete information regarding the presence or degree of disorder. The cases confirm that, for *diagnostic* purposes, formal tests are of little value for ESB children.

### *Evidence of difference versus disorder using alternative assessments*

The data demonstrate the importance of using a battery of assessment techniques when evaluating ESB language development. If data from formal tests had been used in isolation, Luka's language difference could have been interpreted as disorder, resulting in an incorrect diagnosis of SLI. Similarly, the use of any technique in isolation would not have produced a complete picture of either child's language development. The following considers the information provided by each assessment technique in light of each child's unique language learning context.

### **Bilingual backgrounds**

Description of a child's language environment and patterns of language use are essential when assessing bilingual children (De Lamo White and Jin, 2011; Hammer *et al.*, 2004). In each case, a history of L1 and L2 use was obtained through interviews with students and their parents. This information provided a valuable foundation for considering language patterns as typical or otherwise. Despite different cultural and linguistic backgrounds, Luka and Antony shared similar bilingual backgrounds. Both sets of parents were educated in a non-English-speaking country and completed similar levels of schooling. Although both families used some English, L1 remained the dominant language in the home. Extended family and local community groups supported the use of L1. Both families also regularly visited their country of origin, providing opportunities for intensive L1 language development. The strong L1 background for each child suggests that they (a) should have developed normal L1 language use in their early years and (b) should have maintained at least conversational competency in L1 once introduced to L2.

Both children were identified as ESB. A language other than English was the dominant language heard at home during their preschool years. Exposure to English began when they started childcare/school. This pattern is common in children where both parents share a common language other than English (Goodz, 1989; Windsor and Kohnert, 2004). The strong presence of L1 in the home allows children to understand and use this language proficiently. Once at school, English often becomes the preferred language of communication (Goodz, 1989; Hammer *et al.*, 2004; Hemsley *et al.*, 2010). Subsequently, many children develop a passive pattern of L1 development: maintaining a strong understanding of L1 concurrent with limited L1 expressive use at home (Borland, 2006; Pease-Alvarez, 2002; Hemsley *et al.*, 2010).

This pattern of typical sequential development was clear in Luka's case history. Luka was able to understand and use Samoan in his preschool years. Regular exposure to English at school changed the language of home interactions. While Luka can still communicate in L1, he now frequently code switches between Samoan and English during conversations at home, with a preference to use 'mostly English' during everyday conversation with siblings and peers. This aspect of Luka's bilingualism would be described as typical.

Antony's home environment was also L1 dominant, with English exposure beginning at childcare. When he started school, Antony used a mix of L1 and English. Now in his fourth year at school, English is his preferred language of communication. Unlike his siblings

(who are able to understand Vietnamese at home), Antony has not maintained a receptive understanding of Vietnamese. He frequently does not understand information presented in this language. His parents try to use English to maximize comprehension; however his older brother often needs to act as a translator, allowing Antony to understand and participate in interactions more meaningfully. As described earlier, passive L1 development is common in Australian children. A decline in *both* receptive and expressive L1 abilities is not typical, particularly where there is strong maintenance of L1 in the home environment. Therefore, Antony's pattern of L1 development could be described as atypical.

### PCCA

Luka presented with a similar pattern of development to a linguistically matched peer. The numbers of words and sentences produced, as well as average t-unit length were commensurate. T-unit structure was also comparable. Both students predominantly produced single clause utterances resulting in comparable subordination index scores. Analysis of grammatical errors required more careful consideration. Tense errors are considered a clinical marker of language impairment in monolingual English children (Rice and Wexler, 1996). This is not the case in sequential bilinguals, who frequently demonstrate errors in L2 morphosyntax due to cross-linguistic transfer (Bedore and Peña, 2008). Although Luca produced a higher percentage of grammatical errors than his peer, the types of errors (tense and pronoun markers) were typical of Vietnamese-English ESB language learners. Further, grammatical errors did not dominate his narrative, with many t-units demonstrating sound morphological development. This pattern was therefore not considered indicative of SLI.

PCCA presented a clear picture of disorder in Antony. Despite the age difference, his sister provided a unique point of comparison given her matching cultural background. Although a year below Antony at school, her raw scores were well above those of her brother, producing standard scores in the average range. In contrast, Antony demonstrated difficulty understanding and using many concepts and grammatical structures mastered by his sister. This produced lower scores that did not change over a 13-month period. This result, in combination with limited language growth over time, was strong evidence that Antony's language abilities were not typical of an ESB language learner.

### Composite scores

Composite scores are currently viewed as best practice for bilingual lexical evaluation in sequentially bilingual children with 0–4 years of L2 exposure. It

allows the child's total vocabulary to be considered, producing a much higher number of lexicalised concepts than scores in L1 or L2 alone (Hemsley *et al.*, 2010; Peña *et al.*, 2002; Kan and Kohnert, 2005; David and Li, 2005). Clinically, typically developing sequential bilinguals present with composite scores commensurate with monolingual peers (Pearson *et al.*, 1993; Hemsley *et al.*, 2010). Composite scoring also enables analysis of lexical composition: the number of unique words in each language (singlets) compared with the number of words known across L1 and L2 (translation equivalents). In the first few years following L2 introduction, ESB children follow definite patterns in lexical composition. Initially singlets will dominate. However, the number of translation equivalents increases over time, overtaking the number of singlets after approximately two years of regular L2 exposure (Peña *et al.*, 2002; Hemsley *et al.*, 2010).

Monolingual children with language impairment demonstrate slow lexical acquisition. Over time, these difficulties diminish (Spaulding *et al.*, 2013). Bedore and Peña (2008) explain: 'By early school age children with LI (language impairment) ... typically perform within the normal range of development on standardized vocabulary measures'. It is probable that language impaired ESB children demonstrate a similar pattern of slow L2 lexical acquisition. Composite scoring is however a useful methodology to monitor lexical development in the early years of L2 exposure, when rapid acquisition is expected.

We suggest that composite scoring is a less effective diagnostic tool for identifying language impairment after three or four years of L2 exposure. After this period, it would be expected that evidence of slow L2 lexical acquisition would diminish, making lexical assessment redundant. Composite scoring was not used with Luka in this study because he had seven years of regular, consistent L2 exposure. It was anticipated that even if Luka's L2 lexical acquisition was initially slow, evidence of this would be minimal with this level of English contact.

For Antony, composite scoring provided evidence of language impairment rather than language difference. Unlike typically developing ESBs, Antony's composite score was not higher than scores in L1 or L2 alone. The absence of Vietnamese singlets (and overall poor performance in L1) resulted in a standard composite score well below that of monolingual peers.

Analysis of L1 and L2 composition provided further support for atypical sequential development. Although Vietnamese was described as the main language of communication at home (with ongoing daily exposure), Antony's receptive vocabulary in this language was limited. His understanding of

Vietnamese words was limited to common objects and verbs. It is unknown whether Antony once had a stronger Vietnamese vocabulary, which was lost with introduction of L2, or whether his L1 never developed past its current level. His history of late development of single words and word combinations suggest the latter.

Antony demonstrated a broader range and depth of word knowledge in English. During testing, he knew 60 words in English that he could not identify in Vietnamese. This result suggests that English is Antony's dominant language. It explains his preference for using this language when conversing with family members at home as well as the frequent need for his brother to intervene as 'interpreter' when his parents speak in L1 at home. Anthony also presented with an unusual proportion of singlets (78%) versus translation equivalents (22%). Children with ongoing exposure to L1 at home, but more than two years of regular, consistent exposure to L2 present with a 'developmental shift toward adding more (translation equivalents), eventually overlapping more in the words they know in both languages as do adults' (Peña *et al.*, 2002). Maintenance of high proportions of singlets relative to translation equivalents can be evidence of language disorder (Hemsley *et al.*, 2010).

### Dynamic assessment

Dynamic assessment provided valuable information regarding Luka and Antony's learning potential and learning style, and bolstered the results of other assessment techniques. For Luka, the use of complex sentences was targeted for a short period of intervention. He responded to explicit teaching learning the target skills and applying them in two untrained baseline activities. Considerable gains on the CELF-4 baseline task moved Luka's standard score to well within the average range (compared with monolingual peers). This profile is not consistent with a diagnosis of language disorder (Gutiérrez-Clellen, 2000; Miller *et al.*, 2001). Ratings of learning behavior were also consistent with these conclusions. Luka's cognitive and social-emotional behaviors highlighted several attributes of a successful learner: systematic and efficient problem solving, flexibility, application of a range of strategies, and self talk.

Conversely, Antony presented with a profile of limited change over the dynamic assessment period. Despite focused intervention in following two-part instructions, post-test scores showed little improvement. Even with explicit teaching, Antony found it difficult to learn new skills and strategies and transfer this knowledge across activities, a pattern consistent with language disorder (Gutiérrez-Clellen, 2000). Ratings of Antony's learning behaviors were also consistent with this finding. Although social-emotional behaviors were positive, considerable difficulties were

evident on the cognitive scales. Antony presented with a disorganized, haphazard approach to tasks, poor awareness of performance and errors, and restricted use of strategies without prompting. His highest scores were in verbal mediation, meta-cognition and flexibility. High scores in meta-cognition together with flexibility are highly predictive of language impairment for a child Antony's age (Peña *et al.*, 2007).

### Conclusion

Application of a range of assessments techniques resulted in very different conclusions for Luka and Antony. Luka's language skills were consistent with language difference: a typical pathway toward bilingual competency. In contrast, Antony showed evidence of language disorder in every assessment administered: a profile consistent with SLI. The assessments used with Luka and Antony were not exhaustive. A clear limitation was the reliance for L1 evaluation on parent report and composite scoring. While this was not ideal, it reflects the limited time and resources available to clinical SLPs working with school age children. Very few SLPs are bilingual and there is often limited access and budget availability for interpreters. The assessments detailed in this paper were included for their clinical feasibility with monolingual English speaking SLPs.

Attempts to select clinically feasible assessment techniques were thwarted only in the area of time. In many departments, SLPs are allocated a set time for assessments, monolingual or otherwise. This type of policy is inequitable and unrealistic. ESB children do not develop language in the same way as monolinguals. The time taken to learn L2 and its sequence of development are entirely different to monolingual children from either language (Kohnert and Bates, 2002; Goldstein, 2004). To ensure valid assessment and conclusions, the techniques used should be different to those used for monolinguals – a process which, at this point in time, takes longer.

The question of how to complete a clinically feasible and valid assessment is complex. The cases reported here suggest two essential factors when evaluating ESB language development. First, the use of techniques other than formal assessments is crucial. Formal assessments can provide useful information in a repeated baseline context but are insufficient to diagnose SLI in ESB children. Luka's case highlights this conclusion. Reliance on formal measures alone would have resulted in an incorrect diagnosis of SLI. Culturally and linguistically sensitive assessments are essential for accurate evaluation of bilingual language functioning, particularly for identifying difference versus disorder. Conclusions drawn without them are, at best, guesswork. Second, the cases of Luka

and Antony highlight the importance of using a *range* of assessment techniques with ESB children. No single methodology provided a definitive conclusion of difference versus disorder. Each technique by itself was qualitative and of questionable validity. Together, however, they provided a strong body of evidence outlining each student's language abilities in their unique cultural context.

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## Appendix A: Narrative samples used in PCCA and dynamic assessment (Simon, 1987)

Luka Dynamic assessment pre-test:	Comparison child: (PCCA)	Luka Dynamic assessment post- test:
One day the girl watched her ah... the girl watched her favorite movie	There was a girl watching TV. She was watching one of her favorite shows	On Monday the girl had a movie to watch, her favorite movie. And then she bought some cookies
And then when she was um... getting a cookie, her dog was still sleeping. And then he hit the bowl by accident and then the dog woked up	She bumped the chips. The Mum heard the chips fall on the floor. Then she had a surprise. The dog got hit by the chips. It woke it up	Then when she put her hands out to get the cookies she hit the bowl and then they went on the floor. But the dog waked up behind her and when it fell down he waked up
And then she went away to go look for a broom. While she is gone there was no more cookies because the dog ate it	and then the mother told her to um... get the dustpan and to sweep up the chips. So the girl went to get the dustpan	And then the girl looked at it and then went out the back in the kitchen to get the broom. And then the dog started eating when she was away
She came back and she was gonna clean it but there were no cookies left just a bowl lying down. And then the dog was happy	and when she got back the dog had ate the chips. And she was surprised that there was nothing there	And then when the girl got the broom, she was confused where was the cookies. And then the dog was um... at the back chair hiding. And that was it

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# Chapter 5

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## A bilingual child's language profile: Impaired English but intact Vietnamese

**Hemsley, G.,** Holm, A., & Dodd, B. (2013). A bilingual child's language profile: impaired English but intact Vietnamese. *Speech, Language and Hearing, 16*(3), 127-138.

## Preface

Chapter 5 outlines the case of an unusual pattern of language disorder in an ESB child. Peter, an eight year old ESB student (Vietnamese-English) presented with intact Vietnamese abilities but significantly impaired English. Assessment highlighted a specific lexical deficit, characterised by poor lexical development, underspecified lexical templates and inhibited access to lexical knowledge.

Theoretical certainty must underpin our understanding of language disorder in ESB children. Peter's case both challenges and supports existing theories in this field. First, Peter's case is controversial in that it challenges the previously unquestioned assumption that diagnosis of disorder requires evidence of disorder in *both* a bilingual child's languages (Gutiérrez-Clellen & Simon-Cereijido, 2009; Kohnert, 2010; Speech Pathology Australia, 2009). Second, Peter's case is topical because it supports evidence that not all aspects of language are represented in an integrated form in bilingual children. If, as thought, L1 and L2 lexicons are functionally separated in the bilingual brain (Costa, 2005; Kroll, et al., 2005), then it is plausible that lexical language disorder could affect just one language.



# A bilingual child's language profile: Impaired English but intact Vietnamese

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The literature asserts that language impairment always manifests in both languages of a bilingual child. The case reported describes a boy, aged 8 years whose first language (L1, Vietnamese) is intact while his acquisition of English (L2, learned from 4 years) is significantly impaired. Culturally appropriate language assessments included dynamic assessment, composite scoring, and peer-child comparison. Analysis revealed poor L2 lexical development, with underspecified lexical templates and inhibited access to lexical knowledge in English. No such difficulties were evident in L1. Peter's profile allows evaluation of current models of bilingual language development. A specific deficit in lexical inhibition of L1 might plausibly account for impairment only in L2.

**Keywords:** Bilingual, Language, Language impairment, Child, Vietnamese, English, Assessment, Dynamic assessment, Composite vocabulary, Lexicon, Lexical impairment

## Introduction

Bilinguals are not two monolinguals in one (Grosjean, 1982). Rather, their languages are entwined at all levels of processing: semantic, lexical, and phonological (e.g. Costa, 2005; Costa *et al.*, 2005; Kroll and Stewart, 1994; Kroll *et al.*, 2005). For simultaneous bilinguals, two languages are enmeshed from birth. In contrast, early sequential bilinguals (ESBs) acquire at least minimal competence in one language prior to introduction of a second language before age 5 (Genesee, 1988; Kohnert and Bates, 2002).

Language-learning patterns within ESB populations are diverse. Factors including age of L2 introduction, amount, and quality of exposure to each language, societal values, and similarities between language pairs produce 'impressive variability within any group of bilingual learners' (Kohnert, 2010: 461). Despite this variability, consistent patterns of ESB language development are also described. For example, in countries where English is the principal language, ESB children tend to shift from L1 to L2 dominance with increased L2 exposure (Kohnert and Bates, 2002; Kohnert, 2008; Hemsley *et al.*, 2006). Where L1 is developing typically, difficulties with English are usually attributed to slow L2 acquisition (Kohnert, 2008). Variability between skills in L1 and L2 are also typical, being attributed to 'different

features of the child's two languages as well as different opportunities and demands in each language' (Kohnert, 2008: 104).

Slow acquisition of L2 and/or significant variation between L1 and L2 language abilities is not associated with language disorder in ESB children unless there is evidence of disorder in *both* a child's languages (Gutiérrez-Clellen and Simon-Cerejido, 2009; Kohnert, 2010). To date, there are no reports of specific language impairment (SLI) in just one of a bilingual child's languages. Despite this, there are reasons to question the assumption that such a case would never occur. Unless criteria for determining an acceptable degree of 'normal variability' in the languages of ESB children are considered, the assumption that language disorder manifests in both languages can never be challenged.

In other domains of speech and language research, differences in language proficiency between a bilingual's languages have been explored. For example:

1. Research into bilinguals who stutter indicates that both languages are commonly, but not always, affected. The type and frequency of stuttering can differ widely across languages (Van Borsel *et al.*, 2001). Language dominance is a significant factor, with the bilinguals' less dominant language showing increased stuttering severity (Lim *et al.*, 2008; Van Borsel *et al.*, 2001). The role of executive function might explain this pattern. For example, Lim *et al.* (2008) hypothesized that 'system resources' diminish with the load of formulating utterances in a less familiar language while suppressing activation and interference from the dominant language.

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2. Bilingual aphasia literature also reports differences in disorder type and severity across languages. Fabbro (2001) found that 35% of bilingual patients did not exhibit parallel disorder across languages post-stroke: the language of greater impairment was variable, with 20% demonstrating greater impairment in L2 and 15% in L1. The literature has also reported cases where aphasia is only evident in one of a bilingual's two languages, the other remaining intact (Fabbro, 2001). Aglioti *et al.* (1996) described a patient who, post-stroke, presented with severe expressive language difficulties in L1 but intact expressive abilities in L2. Explanations suggest damage to sectors of the brain associated with executive function rather than damage to dedicated language centers (Fabbro, 2001; Lorenzen and Murray, 2008; Green, 2005).

Theoretical explanations for L1–L2 variability in fluency and aphasia research both implicate a subset of cognitive processes (executive function) (e.g. Kroll *et al.*, 2005). These processes are essential for modulating competing information between L1 and L2. They include memory, attention, and inhibitory processes. While executive functioning is currently being explored with typically developing bilingual children (e.g. Bialystok and Viswanathan, 2009; Luo *et al.*, 2010; Bialystok and Craik, 2010), there has been little discussion of the impact of executive processing deficits on the developing bilingual brain. Detailed case studies are needed to provide qualitative evidence about children's atypical bilingual language acquisition.

### *Differentiating typical ESB language development from language impairment*

Speech language pathologists (SLPs) must often determine whether the language abilities of an ESB child are typical for their bilingual background or are impaired. This difficult differentiation has been explored in the literature (excellent discussions can be found in Kohnert, 2010 and Bedore and Peña, 2008). The consensus is that children with typically developing language systems 'effectively ... take advantage of input in the environment to develop efficient language, on par with other children who have similar language experiences' (Windsor and Kohnert, 2004: 878). In contrast, ESB children with SLI learn language less efficiently or effectively: a core language deficit exists in the absence of physical, sensory and cognitive impairment (Windsor and Kohnert, 2004).

When assessing the language abilities of monolingual children, SLPs typically use standardized assessments to diagnose language impairment. These tests need to be avoided with bilingual children: because similarity between ESB children and the standardization group is minimal, standard scores provide no

valid information regarding language disorder (Gutiérrez-Clellen and Simon-Cerejido, 2009; Laing and Kamhi, 2003). This remains true even after several years of L2 exposure. Although language abilities may be intact, limited and different experience using L2 means that bilingual and monolingual language performance is not comparable (Hemsley *et al.*, 2006; Windsor and Kohnert, 2004). Nevertheless, administration of tasks from standardized tests can provide qualitative information because they systematically assess a range of language abilities incorporating graduated levels of difficulty. In particular, repeated testing can provide baseline information in a target area: the child becoming their own reference point to measure skill acquisition over time.

The literature provides a range of alternatives for assessing bilingual children. A combination of approaches is recommended to obtain a complete and valid picture of a bilingual child's language development (Kohnert, 2010). Assessment options that contribute to a valid profile of a child's bilingual language development include:

1. *Dynamic assessment* is a widely used assessment approach for bilingual children. It not only assesses *what* a child learns over time, but also *how* they learn. The most effective format reported is 'test–teach–retest' in a child's second language (Gutiérrez-Clellen, 2000). Assessment identifies a specific area of weakness. Then, during a short period of intervention, the examiner observes the child's performance as a learner (modifiability) while teaching target skills and strategies. Finally, re-assessment provides a measure of the child's ability to apply their learning following intervention. Gutiérrez-Clellen and Peña (2001) reported that 'children who are different, but typical, language learners are capable of demonstrating significant changes. On the other hand, children with language impairments... would demonstrate little or no quantitative change' (p. 222). Essential to the intervention phase of dynamic assessment is modifiability data. Ratings of modifiability are a 'powerful predictor of language impairment' in bilingual children (Peña *et al.*, 2007: 337). Ratings on just two dimensions of a learning questionnaire (metacognition and flexibility) have been shown to differentiate typical versus language disordered bilingual students with over 90% accuracy (Peña *et al.*, 2007).
2. *Composite scoring* was developed to assess lexical skills across L1 and L2 (Pearson *et al.*, 1993). Rather than evaluating each of the child's languages in isolation, composite scoring measures overall lexical acquisition by counting the total number of items correctly identified or labeled across the two languages. Studies have found composite scoring identifies a higher number of lexical concepts than scores in either language alone. This results in a more accurate representation of overall conceptual

knowledge (David and Li, 2005; Hemsley *et al.*, 2010; Kan and Kohnert, 2005; Marchman and Martinez-Sussmann, 2002; Peña *et al.*, 2002).

3. *Peer-child comparative analysis* (PCCA) compares a child's speech and language with someone from a similar language background with no suspected impairment (e.g. Thomas and Hand, 2004; Wyatt, 2001). While it has limited validation, the approach minimizes the likelihood of drawing 'unwarranted conclusions about disorder when a child produces a non-standard response' (Hand, 2000: 7). The 'typically developing' comparison child should be matched for age, gender, and cognitive ability. They should also share the same cultural and linguistic background: having the same type and number of years of exposure to L1 and L2 as the child with suspected disorder.

This paper presents a single case study of Peter, an ESB primary school student. Peter's first language is Vietnamese. English was introduced at 4 years of age. Linguistically, Vietnamese and English are highly diverse. Although Vietnamese is part of the Austro-Asiatic language family, much vocabulary has been borrowed from Chinese. Vietnamese is a tonal language, with alterations in syllable pitch (high, low, or mid) and contour (rising or falling) creating changes in word meaning (Nhan, 1983; Comrie *et al.*, 1996). Syllable structures are also different: English syllables comprise  $(C_{1-3})V(C_{1-4})$ , compared to  $(C_{1-2})V(C_1)$  in Vietnamese. While consonant clusters and final consonants are rare, there are many vowel diphthongs and triphthongs (Nhat, 1977; Nhan, 1983). Although there are 18 consonants in the Vietnamese language, there is limited overlap of sounds between English and Vietnamese (Hwa-Froelich *et al.*, 2002). Like English, Vietnamese has SVO word order (e.g. dogs drink water) (Comrie *et al.*, 1996).

The aim of Peter's assessment was to determine whether his L1 and L2 development was typical or impaired using clinically feasible, culturally and linguistically appropriate measures. L1, L2, and cross-linguistic assessment measures, in conjunction with a thorough case history, cognitive and hearing tests, provided a full picture of Peter's language abilities at home and school.

## Participant

### Background information

Peter is a bilingual child who has lived in Australia all his life. His parents moved to Australia from Vietnam before Peter was born. They settled in a suburban area with many other families of Vietnamese origin. Australian census data identify this area as one with low socio-economic status: the Index of Relative Socio-economic Advantage and Disadvantage ranks

Peter's suburb at the fifth percentile (Australian Bureau of Statistics, 2006).

Peter attends his local public school. It is highly multicultural with 70% of students being bilingual. Indigenous Australian, Pacific Island and Vietnamese language backgrounds dominate. Students begin school with varying levels of English exposure, although like Peter, the majority would be described as early sequential bilinguals, with limited English exposure prior to starting school.

Peter started preschool at 4 years of age, attending  $2\frac{1}{2}$  days a week for one year. He commenced full time education in year 1 at 5;4 years of age. Peter was referred by his class teacher for a speech pathology assessment during Year 2. At this time he was identified as having significant language difficulties and subsequently received nine months of individual therapy sessions targeting vocabulary development and sentence formulation related to classroom units of work. Therapy goals were integrated into Peter's classroom activities, and he also received individual teacher aide follow up sessions three times a week.

During therapy Peter was observed to have great difficulty expanding his expressive vocabulary. He required introduction of one or two concrete words across several contexts in therapy, with daily follow-up by the class teacher. Many everyday words continued to be difficult for Peter despite focused therapy, for example glass, power point, toast, knife, bowl, dirty, bus, and helicopter. Classroom testing indicated that the same vocabulary items were learned by ESB peers within the classroom context without any additional support.

Peter demonstrated particular difficulty retrieving a label for a known concept or object. He frequently used pointing, gestures, drawing pictures, or describing an object to convey his ideas. Although his speech production was normal, Peter also consistently gave incorrect representations of many words. For example, Peter consistently called a *helicopter* a 'harrypotter', and a *bus* a 'bird'. These difficulties were exacerbated in a conversational context: Peter had great difficulty formulating ideas into complete sentences which greatly interfered with communicative flow.

### Parent interview

Parent interview revealed that Peter was born in Australia, at term, following a normal pregnancy. No medical complications were evident during or following his birth. During childhood Peter had no serious illnesses or accidents, and no middle ear infections. Peter spoke his first words at 18 months and started to put words together at 2 years of age. His other physical developmental milestones were within normal limits.

Peter's first language, and the language primarily used at home, is Vietnamese. The strong representation of this culture in his community provided him with rich language exposure during his early years. Peter had minimal exposure to English during this time. His first regular contact with English occurred when he started preschool at 4 years of age, confirming his description as an early sequential bilingual.

Mr N reported that Peter uses Vietnamese all of the time when communicating with family and friends at home. Peter prefers to speak Vietnamese with bilingual friends and family members, even those who speak fluent English. Peter's understanding and use of Vietnamese was described as 'far better' than that of his brother, David, who is 15 months younger than him. Conversely, David had a better developed understanding and use of English, preferring to use this language when communicating with bilingual family and friends. David's teacher's reported good progress at school, with no concerns regarding English language development.

Mr and Mrs N reported that Peter has no difficulty comprehending instructions and information presented in Vietnamese. They described his Vietnamese expressive language as 'confident and fluent', without word order or grammatical errors. They also reported a good vocabulary with few communication breakdowns during conversation. His speech clarity was described as easy to understand.

## Assessment results

The following presents data from a review assessment completed with Peter at 7;7 years of age (12 months following initial assessment). Given limited progress during therapy and the ongoing severity of his difficulties in the classroom, thorough assessment was undertaken. At the time of assessment he was in year 3 at school.

### Hearing and psychometric assessment

An audiologist reviewed Peter's hearing. Pure tone audiometry revealed bilateral normal hearing. Speech audiometry results also showed satisfactory speech discrimination for single words at normal levels.

**Table 1 WISC-IV results age 7;9 years**

Scale	Standard score	Percentile rank
Verbal Comprehension Index	71	3
Perceptual Reasoning Index	94	34
Working Memory Index	74	4
Processing Speed Index	88	21

Note: Mean SS = 100; SD = 15.

An educational psychologist administered a cognitive assessment at 7;9 years of age. Given his bilingual background, valid assessment using standardized assessment tools was difficult. The Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) was administered to enable evaluation of Peter's cognitive strengths and weaknesses (Wechsler, 2003). The psychologist noted that scores should be interpreted with caution, particularly in Working Memory tasks where the complexity of instructional language may have affected Peter's performance. Peter's standard scores are reported in Table 1.

### Language assessments

Peter's language skills were assessed by a monolingual, English speaking SLP over several weeks. The results are presented in the following sequence: Formal Language Assessment; Composite Scoring; Picture Name Judgment; Peer Child Comparative Analysis; Vietnamese Narrative Sample; Dynamic Assessment.

### Formal language assessment

Quantitative information regarding Peter's English language skills was obtained at both initial and repeat assessment during year 2 (6;7 years) and year 3 (7;7 years). Several tasks of the Comprehensive Assessment of Spoken Language (CASL) (Carrow-Woolfolk, 1999) were administered. This test provides no standardized data for bilingual children and therefore standard scores could not provide a valid measure of Peter's overall language development. Instead, results provided baseline data. Specifically, repeat administration enabled evaluation of changes in Peter's language skills over a 12-month period, rather than an absolute statement of ability levels in comparison to other children. Results are recorded in Table 2.

### Composite scoring

To obtain further information regarding Peter's *receptive* vocabulary the Peabody Picture Vocabulary Test: Revised (PPVT-R) was also administered (Dunn and

**Table 2 CASL results at age 6;7 and 7;7 years**

Age	6;7 years		7;7 years	
	Raw score	Standard score	Raw score	Standard score
Scale				
Antonyms	8	74	13	77
Sentence Completion	7	59	12	59
Syntax Construction	9	63	14	66
Paragraph Comprehension	2	61	29	93
Pragmatic Judgment	13	79	19	82

Note: Monolingual standard scores are reported for internal comparison only. They do not accurately reflect Peter's degree of language difficulty as his linguistic experiences do not match those of the standardization sample.



Dunn, 1981). Being a word-level task, this assessment also provided an excellent opportunity to examine the composition of Peter's lexical system across both languages through composite score methodology. The test was initially administered in Vietnamese at age 8;0 years, then 3 weeks later in English.

The Vietnamese test was completed by a Vietnamese-speaking teacher at Peter's school. Before testing, the teacher was trained in administration of the test, with Vietnamese equivalents for each of the PPVT-R vocabulary items decided and recorded. A monolingual English speaking SLP was present to assist with test administration.

Peter demonstrated dominance in Vietnamese receptive vocabulary, obtaining a raw score of 90 in Vietnamese and 54 in English. A composite score was then calculated by awarding a single point for each item Peter identified, independent of language (see Fig. 1). This resulted in a composite raw score of 93. A monolingual child with this raw score on this test would achieve a standard score of 105; within the average range (mean = 100; SD = 15).

Analysis of the composition of Peter's lexicon was achieved by calculating the number and proportion of singlets (words known in just one language) versus translation equivalents (words known in both languages). Peter presented with 42 singlets (70%) overall, of which 39 were Vietnamese. There were just three English singlets. He identified 18 translation equivalents, accounting for 30% of responses. He was unable to identify nine words in either language.

During the Vietnamese assessment Peter was confident. He frequently engaged in 'self talk' to problem solve difficult items. He did not hesitate to request clarification from the teacher using Vietnamese. For example, when Peter was presented with the word 'banister', he looked at the pictures carefully before commenting, 'It's not there'. He then went on (in Vietnamese) to describe what he thought the picture should look like. The transcribed message was translated as, 'A banister is like a verandah to walk out on and look around ... like outside my classroom'. The

teacher later explained that verandah and banister are represented by the same word in Vietnamese.

Throughout the Vietnamese assessment, the English-speaking SLP noted that Peter engaged in several language behaviors not present in English. He frequently initiated conversation with the teacher in Vietnamese. He responded fully to questions using sentences and extended conversations begun by the teacher. Peter's conversational Vietnamese was also fluent, with none of the noticeable pauses or hesitations characteristic of his English expression. In contrast to his communication style in English, Peter did not engage in use of gestures or actions to augment his message.

### Picture name judgment

A picture name judgment task was administered to provide additional information regarding lexical integrity and processing (age 7;7 years). Peter indicated whether the SLP correctly labeled pictures of everyday items. The 81 items included 27 accurate labels, 27 semantic foils (e.g. 'tree' for flower) and 27 phonological foils with single sound errors (e.g. 'spizer' for spider). Peter's total score on this task was 53/81. He scored 20/27 (74%) on semantic foils, but demonstrated considerably greater difficulty with phonological foils, scoring 6/27 (22%).

### Peer-child comparative analysis

To obtain further information regarding Peter's English development in his particular bilingual context a PCCA was completed at age 8;0 years. This qualitative assessment technique compares a child suspected of language disorder with a 'typically developing' child from the same cultural and linguistic background (Terrell *et al.*, 1992; Wyatt, 2001).

The high percentage of Vietnamese-English bilinguals at Peter's school enabled selection of a highly compatible comparison child. This male student was in the same year level (age 8;2 years) with a well-matched cultural and linguistic history. His teacher

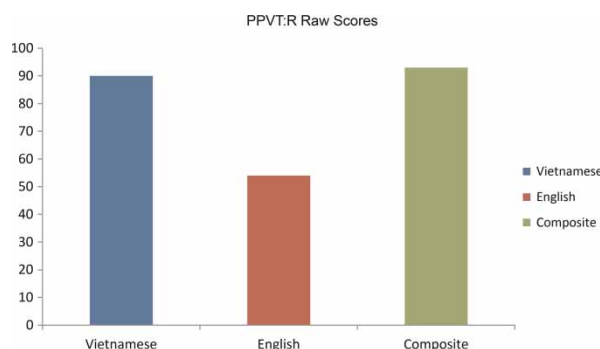


Figure 1 Peter's cross-linguistic PPVT-R results.

Table 3. Narrative retell analysis for Peter and a peer

	Peter	Peer
Productive output:		
Total number of <i>t</i> -units	19	28
Total number of words	153	236
Average <i>t</i> -unit length (words)	8.1	8.4
<i>t</i> -unit structure:		
% <i>t</i> -units containing 1 clause	57%	50%
% <i>t</i> -units containing 2+ clauses	43%	50%
% <i>t</i> -units containing coordinating conjunctions	16%	4%
% <i>t</i> -units containing subordinating conjunctions	11%	25%
Sentence quality:		
% <i>t</i> -units containing grammatical errors	84%	35%
% <i>t</i> -units containing disruptions	79%	4%
Number of different verbs	17	29

described his English language development as 'typical' when compared with other bilingual students in the class, resulting in pass-level grades across the curriculum.

Peter and his peer were assessed using a narrative retell task: Peter and the Cat (Allan and Leitaio, 2003). Compared to the clinical tasks of the CASL, this assessment provided a more holistic view of Peter's language during a functional task. Narrative samples were transcribed (see Appendix A) and segmented into *t*-units. Analysis evaluated productive output, *t*-unit structure, and sentence quality. Results are outlined in Table 3.

Analysis of the narratives indicated that Peter and his peer produced *t*-units of comparable average length. Despite this, Peter's narrative was less detailed, demonstrating less words and *t*-units. He also used a small bank of concrete verbs repetitively (e.g. go, hear, say, climb, look, come). In contrast, Peter's peer used a wide range of verbs including abstract and reflective terms (e.g. decided, reached, grabbed, explained, hold, lose).

Both boys demonstrated interference of Vietnamese grammatical forms while speaking in English (e.g. inconsistent use of plural and past tense markers). Peter had a much higher percentage of grammatical errors (84%) compared to his peer (35%). Peter's narrative was also difficult to follow because of the high proportion of disruptions, with 79% of *t*-units exhibiting false starts, repetitions, filled pauses, or reformulation of ideas mid-sentence (Dollaghan and Campbell, 1992). The following excerpt demonstrates how these behaviors, which his peer demonstrated in less than 5% of utterances, greatly affected the integrity and flow of Peter's narrative.

He climb up the tree and rush... rescue cat.

He say terp... help.

It were... he saw a... young man who wash... washing his garden.

He... the young man was say... hear... him say hep.

Tank... he was still cry... frighten, but he say, 'Thank-you' to the man.

Structurally, both students had a similar ratio of simple to complex sentences. However, Peter used more coordinating conjunctions (e.g. and, and then, and so), and less subordinating conjunctions (when, because, so that) than his peer.

### Vietnamese narrative sample

To gain some understanding of Peter's Vietnamese language abilities, a Vietnamese narrative sample

was also collected. The 'Peter and the Cat' narrative retell task was administered, with all instructions and content being spoken in Vietnamese by a trained teacher whose L1 was Vietnamese. The recorded narrative was transcribed and translated separately by two Vietnamese-speaking teachers, both of whom had previously worked with SLPs in L1 language transcription and analysis. Text structure and content were analyzed by the English-speaking SLP in consultation with these teachers.

Peter's Vietnamese sample was flowing and fluent: the fluency clearly apparent to the English-speaking SLP when she listened to the recorded text. Peter's strong tendency to hesitate and reformulate sentences in English was absent in Vietnamese. The transcription indicated only one disruption, where Peter repeated a phrase.

Analysis of his sentence structure indicated that Peter used complete sentences when speaking in Vietnamese. There were no missing words or word order errors. Rather than repetitive, simple sentence structures (characteristic of his English narrative sample), Peter demonstrated mastery of a range of simple and complex sentence types. There was only one grammatical error in the retell, relating to pronoun choice in the sentence, 'Then he (a boy) thanked him (a man)'. Here, Peter marked the pronouns incorrectly, with 'he' as a man, and 'him' as a boy. The content of Peter's narrative was also good. He used appropriate vocabulary and concepts to provide an accurate, well-sequenced narrative.

### Dynamic assessment

Information regarding Peter's language learning style and response to therapy was obtained using Dynamic Assessment procedures. Specifically, Peter was assessed, given a short period of intervention then re-assessed over a 4-week period between the ages of 8;1 and 8;2 years.

Peter's language was assessed using the associations task of the WORD Test 2 Elementary (Bowers *et al.*, 2004). This task required Peter to listen to four words, identify one word that did not belong in the group, then give a category for the remaining three words. It was selected for collection of baseline data as it assessed expressive vocabulary and semantics, both known areas of difficulty for Peter. Peter achieved a raw score of three on this task.

The ability to produce categories was selected for a short period of intervention. Individual therapy was provided over two sessions with the SLP. Intervention did not include the test items, test materials, or the test format. Instead, learning was facilitated through strategy and skill building, which were practised and reflected on using real-life examples.

A re-test of the target area was completed following the intervention phase. On the association's subtest of the WORD Test 2, Peter's raw score increased from 3 to 5. Peter's profile of limited change over the dynamic assessment period was consistent with diagnosis with a core language deficit. The results indicate that even with explicit teaching, Peter found it difficult to learn new skills and strategies and transfer this knowledge across activities.

During the intervention phase, modifiability was measured using the Mediated Learning Observation format suggested by Peña *et al.* (2007). Peter demonstrated the highest scores (indicating the greatest difficulty) on three of the cognitive scales. His meta-cognition score (3.5) highlighted a lack of awareness of errors during tasks. Problem solving was approached by trial and error with sketchy planning (score 3). Flexibility was also limited, with restricted use of strategies without prompting (score 4). Scores of three or more on the latter two measures (in combination) are highly predictive of language impairment in students Peter's age (Peña *et al.*, 2007).

During the intervention phase, Peter consistently labeled several words incorrectly. Although he could repeat modeled words accurately, during conversation he would apply an incorrect form. These incorrect labels were often phonetically, and sometimes semantically, related to the target word but were consistently applied across contexts. For example, shapes was 'shaves', weather was 'windy', vegetables was 'fenchibles', transport was 'transpork', and playground was 'paygound'.

## Discussion

Early sequential bilingual children develop their languages differently to monolingual children in either language. Valid assessment of ESB children's language therefore requires consideration of both L1 and L2. Children with typically developing language demonstrate efficient language skills which make the most of their environmental exposure to each language. Conversely, children with SLI are thought to learn language less efficiently and effectively in both languages (Windsor and Kohnert, 2004; Gutiérrez-Clellen and Simon-Cerejido, 2009; Kohnert, 2010).

Peter challenges the assumption that language impairment will always manifest in *both* languages of a bilingual child. Thorough assessment revealed that Peter's Vietnamese was intact, with no language difficulties or concerns identified through parent report or L1 assessment. Peter's L2 development, however, was clearly impaired. Analysis of error patterns on culturally and linguistically sensitive measures identified key areas where Peter's skills were not consistent with language patterns found in typically developing

ESB students with similar L2 exposure. The following discussion considers an explanation for his pattern of language impairment.

## Markers of impairment

We propose that Peter presented with a specific lexical impairment, with difficulty storing new and complete phonological templates for English words. This impairment manifested in several ways including unusual and frequent naming errors, a limited English vocabulary, atypical vocabulary composition, and difficulties retrieving familiar words. These difficulties were exacerbated in a sentence context, resulting in highly disrupted utterances that were difficult to follow. Impairment was evident across a range of assessments with difficulties persisting despite a lengthy period of targeted intervention.

## Unusual and frequent naming errors

Cross-cultural studies of typical monolingual and bilingual lexical acquisition indicate that children make surprisingly few naming errors (Thordardottir, 2005; Bedore and Peña, 2008; Pena *et al.*, 2001). When typically developing children do make naming errors, these 'seem logical and have their basis in lack of child experience or development' (Bedore and Peña, 2008: 4). In contrast, Peter presented with a high proportion of unusual and persistent naming errors in English. Frequent naming errors were apparent in his narrative retell (during PCCA) and throughout the mediation phase of dynamic assessment. Although he could repeat modeled words accurately, during conversation he consistently applied an incorrect label to many words, irrespective of their frequency of occurrence. The error forms were generally phonetically related to the target word, e.g., shapes was pronounced 'shaves', bus as 'bird', weather as 'windy', helicopter as 'harrypotter' and vegetables as 'fenchibles'. The frequency and consistency of these errors over time is not consistent with typical L2 development in ESB children, who modify their lexical representations (particularly for high frequency words) with repeated L2 exposure. It indicates difficulty laying down and storing complete phonological templates for English words.

## Irregular vocabulary composition

Composite scoring revealed that the composition of Peter's receptive lexicon across languages was atypical. Despite his age (8 years) and 4 years of consistent exposure to English at school, his profile was consistent with Australian ESB children who have limited L2 exposure. Peter's vocabulary was L1 dominant: 70% of the words tested were Vietnamese singlets. Very few words were translation equivalents (known in both L1 and L2) and even fewer were English singlets. This pattern is similar to young (4- and 5-year

olds) sequential bilinguals with limited exposure to L2 (Hemsley *et al.*, 2010; Kan and Kohnert, 2005; Peña *et al.*, 2002). Children with Peter's level of L2 exposure more typically present with a 'developmental shift towards adding more (translation equivalents), eventually overlapping more in the words they know in both languages as do adults' (Peña *et al.*, 2002: 946). Children slower to acquire translation equivalents are at higher risk of language impairment (Hemsley *et al.*, 2010).

### Limited response to intervention

During formal assessment (repeated over a 12-month period), Peter showed limited improvement on Antonym and Sentence Completion tasks. Typically developing ESB children would be expected to show steady progress in these tasks over time. Peter maintained difficulties retrieving and generating an appropriate, single-word response. This was despite 9 months of targeted lexical intervention, including individual speech therapy sessions, classroom follow up as well as regular, targeted teacher aide support. Qualitative analysis of responses on formal tasks indicated that Peter continued to lack the English vocabulary to provide an accurate response but also, at times, he could not retrieve a known answer. During assessment, he frequently expressed frustration at knowing a word but not being able to say it.

Peter also demonstrated a poor response to intervention in a dynamic assessment framework. The ability to generate category names was selected as a target for mediation, with learning facilitated through strategy and skill building. Peter's low post-test scores were again evidence of language impairment (Gillam *et al.*, 1999; Gutiérrez-Clellen, 2000; Peña *et al.*, 2007). Explicit mediation failed to facilitate Peter's learning of new skills and strategies or transfer of knowledge across activities.

Low modifiability scores (obtained during dynamic assessment) are an additional marker for language impairment in bilingual children. For example, Peña *et al.* (2007) identified two measures of modifiability (metacognition and flexibility) which, in combination, 'resulted in unusually accurate decisions about which children were and were not identified as language impaired' (p. 338). Peter scored poorly on both these measures, consistent with a diagnosis of language impairment.

### Significant difference to a matched peer

PCCA allowed investigation of Peter's lexical abilities in comparison to a linguistically matched peer. Analysis of narrative samples from Peter and his peer again indicated that Peter had a specific lexical impairment. Comparatively, Peter's vocabulary was limited, resulting in a text with far fewer words and

*t*-units. Accuracy of his retell was exacerbated by the repetitive use of a small number of verbs. The peer's narrative showed evidence of language patterns typical in ESB children: it was longer, and contained a wider range and depth of verbs.

Further analysis revealed that Peter had significant vocabulary retrieval difficulties. Seventy-nine percent of *t*-units exhibited disruptions, characterized by false starts, repetitions, or reformulation of ideas mid sentence. Most disruptions occurred when Peter self-corrected incorrect word choices or 'groped' for the right words to convey his message. This affected the flow and fluency of Peter's narrative, making it extremely difficult to follow. These behaviors are common word finding strategies in children with SLI and are considered evidence of language impairment (MacLachlan and Chapman, 1988; Dollaghan and Campbell, 1992; Crosbie *et al.*, 2010). Further, these behaviors were almost non-existent in the comparison child (with just 4% of *t*-units exhibiting disruptions).

### Impact on syntactic functioning

Peter's ability to construct grammatically correct sentences did not improve despite focused intervention between assessments. Missing words, word order, and grammatical errors characterized his sentences. Peer comparison highlighted that Peter used fewer complex sentences and made more grammatical errors than his peer (84% compared to 35%). It is our opinion that Peter's difficulty constructing complex, grammatically correct sentences largely reflected his lexical difficulties: his impaired ability to access and retrieve words on-line diminished his expressive language capabilities. There is a significant flow-on effect of lexical difficulties. Windsor and Kohnert (2004) note that 'sufficient lexical knowledge, in terms of vocabulary breadth and depth, as well as efficient access to this knowledge, plays an integral role in the general competency and integrity of observed language performance' (p. 879).

### Vietnamese language abilities

The literature indicates that bilingual children demonstrate language impairment across both languages (Gutiérrez-Clellen and Simon-Cerejido, 2009; Kohnert, 2010). While the *severity* can vary between L1 and L2, the *type* of impairment generally presents across languages (Kohnert, 2010; Lim *et al.*, 2008; Fabbro, 2001). Peter's lexical impairment was also expected to manifest, to some degree, in Vietnamese.

Peter's lexical abilities differed widely between languages. In fact, he displayed no evidence of disorder of any kind in Vietnamese. Administration of the PPVT-R in Vietnamese demonstrated a well-developed receptive vocabulary. In contrast, Peter had a limited English vocabulary. In Vietnamese, Peter



confidently produced fluent, coherent sentences without word finding difficulties or word errors. In English, Peter produced halted, disrupted sentences characterized by frequent word errors. Analysis of Peter's Vietnamese sentences revealed mastery of a range of simple and complex structures without grammatical errors. Peter's English sentences were simple in structure, with missing words as well as frequent word order and grammatical errors.

Information from Peter's parents revealed that, unlike his younger brother, Peter favored using Vietnamese at home with adults, cousins, and friends. Similarly at school, Peter preferred to speak Vietnamese with staff or peers who shared his first language. Vietnamese-speaking teachers described Peter's L1 conversational skills as well developed. He was able to engage in discussions and answer questions with confidence and fluency. This pattern of strong ongoing L1 dominance is unusual in Australian ESB children with Peter's level of L2 exposure. Once at school, the increasingly strong emphasis on English results in L2 becoming the preferred language of communication (Goodz, 1989; Hammer *et al.*, 2004; Hemsley *et al.*, 2010). While L1 remains the language of the home, the preference to use English with friends and family increases over time. Many children become 'passive' bilinguals: their understanding of L1 being sufficient to comprehend conversations with family members even if they are not able to, or choose not to, respond in L1 (Borland, 2006). It is interesting that Peter's younger brother developed this typical pattern of passive bilingualism at home. In contrast, Peter's specific L2 impairment appears to have left him reliant on, and to some extent trapped, using his unaffected L1.

### *A new type of bilingual language disorder?*

Peter presented with intact L1 development and co-occurring lexical impairment in L2. This unexpected profile has important implications regarding the nature of bilingual language disorders. Specifically, it challenges the assumption that language disorder in bilingual children will always present in both languages (Kohnert, 2010; Gutiérrez-Clellen and Simon-Cereijido, 2009).

This type of bilingual impairment, with skill levels differing widely between languages, is new to the developmental language literature. The case is not surprising, however, given research in aphasia and stuttering across languages. For example, greater stuttering severity in a bilingual's less dominant language is thought to occur as they formulate sentences in a less familiar language while also suppressing activation/interference from the dominant language (Lim *et al.*, 2008; Lorenzen and Murray, 2008). Similarly, cases of aphasia presenting in just one of a

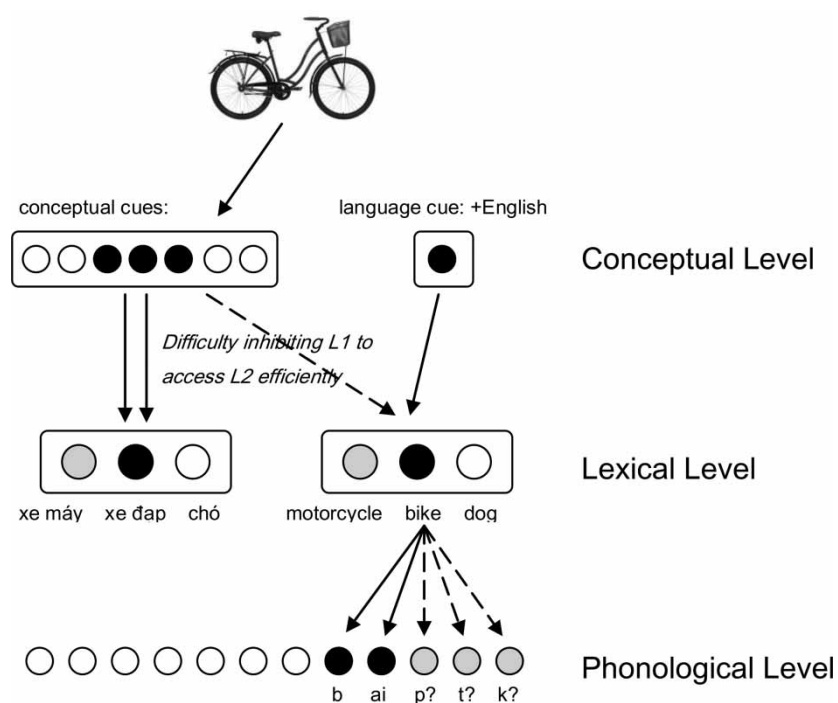
bilingual's two languages are associated with brain centers dedicated to executive function rather than language processing (Fabbro, 2001; Green, 2005; Lorenzen and Murray, 2008).

Difficulties with executive function may also explain Peter's language profile. Executive function is necessary to modulate L1 and L2 in the bilingual brain. Processes including attention, memory, and inhibition are essential to language selection and use (Costa, 2005; Kroll *et al.*, 2005). Research suggests that children with poor executive function find it difficult to modulate competing information between languages, thus delaying acquisition or lowering proficiency (Kroll *et al.*, 2005). In Peter's case, executive function deficits could affect his ability to inhibit L1 lexical representations to access his weaker L2 lexicon.

Application of an executive function deficit to current models of bilingual language clarifies why Peter's lexical impairment presents in L2 but not L1. These models show processing at three main levels: conceptual, lexical, and phonological. (e.g. Costa *et al.*, 2005; Kroll *et al.*, 2005). Conceptual and phonological processing are not language specific. Conversely, lexical processing *is* language specific, with separate representations in L1 and L2 (Kroll *et al.*, 2005). Alternatives from both languages are activated simultaneously, even in language exclusive tasks (Kroll *et al.*, 2005; Costa, 2005). In Peter's case, *only the L2 lexicon* is affected (see Fig. 2). He lacks sufficient executive function to consistently suppress strong links to his L1 lexicon in order to efficiently and effectively access the separately stored L2. This plausibly explains why Peter's L1 lexicon, and his access to it, remains intact.

Peter's difficulties forming complete, accurate templates in his L2 lexicon are also logical in this paradigm. As highlighted in Fig. 2, difficulties in selectively attending to the L2 lexicon would make word learning problematic and result in underspecified or incorrect templates for words (Holm, 1999). This fits with Peter's frequent word errors. He generally produces a correct syllable shape, with sound substitutions often close to the target. For example, when laying down the word 'shapes', Peter had laid down a CVCC syllable structure with correct sound representations for all but one consonant. His production as 'shaves' indicates the presence of an underspecified consonant, resulting in an inaccurate label for the word. The vast majority of Peter's word errors fit this pattern, for example, 'harrypotter' for helicopter; 'fenchibles' for vegetables, and 'transpork' for transport. Even with focused intervention teaching high-frequency words, Peter lacked the skills to identify and change underspecified or incorrect word templates.

Peter's significant difficulty identifying phonological foils in the picture name judgment task (scoring



**Figure 2** Model of bilingual spoken word production (adapted from Kroll *et al.*, 2005). Included are proposed areas of weakness for Peter. Difficulties inhibiting strong links to the L1 lexicon hinder effective and efficient L2 access. This affects the quality of L2 lexical representations, with templates for many English words being underspecified or incorrect. In this example, Peter knows the word ‘bike’ and has a template for the syllable structure and some sounds, but has incomplete information regarding the final consonant (i.e. voiceless plosive with no place specified).

6/27) can be explained in a similar manner. In these items, Peter willingly accepts incorrect templates (e.g. ‘birg’ for bird) because they are ‘close enough’ to his underspecified templates. The syllable shape is correct and sound substitutions are close to the target. He is only able to reject a foil when his template is complete, making identification of error sounds possible.

Assessment using more controlled stimuli would be necessary to confirm if Peter’s difficulty with L2 stems from an executive function deficit (e.g. the ‘faces task’ discussed in Bialystok and Viswanathan, 2009). However, the available data do support this hypothesis. Cognitive assessment showed that Peter’s working memory skills were very poor. The tangled nature of Peter’s English expression, with frequent disruptions is also evidence of executive function deficit. Difficulties efficiently accessing the L2 lexicon would drain cognitive resources. Automaticity is essential to free up processing capacity for sentence planning (Wijnen, 1990; Crosbie *et al.*, 2010). Without automaticity, Peter has reduced processing capacity to plan, organize, and structure utterances during conversation and academic tasks. The system would easily become overwhelmed, resulting in the disrupted, halting speech characteristic of language impairment (MacLachlan and Chapman, 1988; Dollaghan and Campbell, 1992). The opposite is true in Vietnamese. Here, automatic lexical access ensures

sufficient processing resources are available for sentence planning. The result is smooth, fluent speech production in L1.

## Conclusion

Peter’s L1, Vietnamese, was ‘intact’ on assessment and parent report measures while L2 English language skills were impaired despite more than 4 years of consistent exposure at school. Peter demonstrated consistently poor lexical development characterized by a limited vocabulary, underspecified lexical templates and inhibited access to this knowledge. Peter challenges the assumption that language impairment will *always* manifest in both languages of a bilingual child. While it is important to acknowledge this as a single case, theory must be able to explain the development of language in all children.

Application of executive function skills to current models of bilingual language provides a plausible explanation for Peter’s language profile. The lexical level of processing in bilinguals is language specific, with discrete representations for L1 and L2. In Peter’s case, executive functioning difficulties have impaired access to, and use of, the L2 lexicon (English). This affects the integrity of lexical representations, with data revealing underspecified or incorrect templates. The L1 lexicon and access to it remain intact, resulting in no such difficulties in Vietnamese.

## Acknowledgements

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## Appendix A

### Peer-child comparative analysis: narrative samples – ‘Peter and the Cat’

Peter	Comparison child
Peter lu... uh this Peter... who like animal	Once there was... a boy named Peter. He loves animals
One day he go... the... he go back to school and he he...he hear sss... Peter... a cat said miaow. And this time the cat was say... miaow loudly	When he was walking down the pathway he heard a cat said miaow. He look behind him and he didn't see the cat. So when he looked up on the tree he saw the cat
He climb up the tree and rush... rescue cat.	So he 'cided climbing up the tree
Mmm... he look-ed down and say... down... sss...he was frighten... frightened... and scary	And he reach-ed the top he grabb-ed the cat but when he looked... when he looked down he was very frightened because the tree was very high. And so he hold on tight as he could so he wouldn't lose his balance
He say terp... help	And then... Peter didn't know what to do so he yelled, 'Help!'
It were... he saw a... young man who wash...washing his garden. He... the young man was say... hear... him say hep	And then a man, he was watering his garden, heard him said help. He looked everywhere but could not see him, then looked on the tree then saw him
And... and the young man sss... said quickly. And the young man... come... c... come quickly up and get him and the cat down	Then the man took the ladder and put it on the tree and Peter climbed down it with the cat
Tank... he was still cry... frighten, but he say, 'Thank-you' to the man	And he said to the man, 'Thank-you for helping me'
When he come home his Mum say, 'Why do you go home late?' And he was tol' his Mum about the story. And... umm... he say, 'Can I keep the cat please?' And his Mum say, 'Yes, and... but you not allowed to go... climb up the... ah... umm...the... big tree. Next time tell a op... a... a young man who help you ok?' 'Yes Mum'	When Peter got home his Mum was... sad because he was home late and Peter explained where he has been. And he said he has been on a tree helping the cat. And his Mum was not angry anymore but then his Mum said, 'Don't climb a tree, tell a adult to help you'. And then Peter say, 'Can I keep the cat?' And his Mum said, 'Yes'. And that's the end

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## SECTION THREE:

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CAN TARGETED INTERVENTION  
ENHANCE L2 LEARNING FOR  
AUSTRALIAN ESB CHILDREN?

# Chapter 6

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## Better in both? Bilingual intervention in an Australian school context

**Hemsley, G.**, Holm, A., & Dodd, B. (2014). Better in both? Bilingual intervention in an Australian school context. *Australian Journal of Education*, 58(2), 139-152.



## **Preface**

The final section of this thesis considers ESB language development from an educational perspective. The year six study (Hemsley, Holm & Dodd, 2006: see Appendix 1)) considered the development of typical ESB students. Students included in the study:

- had at least six years of regular, consistent exposure to English;
- were reported by their teachers to be performing at pass level or higher in the classroom;
- had no history of hearing loss, learning difficulties or speech therapy; and
- considered English to be their dominant and best language.

Despite these positive indicators, the English language abilities of these typically developing ESB students were lower than expected. Specifically, their understanding and use of English words was significantly below the level of their monolingual peers.

This result should not be interpreted as evidence of pathology. It does, however, indicate incomplete acquisition of aspects of L2 (Kohnert & Bates, 2002; Nicoladis & Genesee, 1997). Australian educators need to develop a further awareness of ESB language learning, as well as effective pedagogies for enhancing L2 development. Knowledge and skills in this area will be vital to ensure the ever-increasing proportion of ESB children in Australia are not ‘left behind’ in key learning areas.

Chapter 6 specifically examines one option for enhancing L2 development in young ESB children. This study evaluated a nine-week bilingual intervention in the key learning area of mathematics. Year one Samoan-English ESB children participated in the study that overlaid their regular classroom mathematics program. One group received all instruction in English. A second group received half of their lessons in English and half in Samoan. The material covered by both groups and the amount of instruction was the same. The only difference was in the language of instruction.

Data regarding conceptual and mathematical knowledge was obtained using formal assessments administered before and after intervention. The data reveal important theoretical findings regarding the influence of L1 on L2 learning, as well as the nature of lexical acquisition in ESB children in an educational setting.

# Better in both? Bilingual intervention in an Australian school context

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## Abstract

This study evaluated a bilingual intervention in the key learning area of mathematics. Nine typically developing Samoan–English students received math lessons in both Samoan and English. A control group of Samoan–English students received all lessons in English. The material covered and the amount of instruction was the same for each group. The only difference was in the language of instruction. Two assessments measured progress in early mathematical skills and concept development. Initial data from each test in isolation indicated no additional benefit for students who received bilingual intervention. Further analysis revealed two interesting patterns of learning between tests. First, all students more easily acquired rote mathematical skills and knowledge than conceptual knowledge and its associated vocabulary. Second, there were differences in patterns of learning between groups. The control group acquired mathematical skills but made limited progress acquiring conceptual knowledge. In contrast, the intervention group demonstrated more balanced learning: acquisition of core math skills was matched by gains in conceptual development. We propose that bilingual intervention facilitated English word learning, producing improved learning of core skills linked to underlying conceptual knowledge.

## Keywords

Bilingualism, bilingual education, mathematics, intervention, Samoan, vocabulary, mathematical concepts, learning

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## **Introduction**

Australian census data reports that 21% of Australians use a language other than English at home. Over 400 languages are represented (Australian Bureau of Statistics, 2006a). Children in this situation are often early sequential bilinguals, for whom a minority language is the dominant and first language introduced to children at home (L1). Regular exposure to English (L2) generally occurs when the child starts childcare or school.

Once at school, early sequential bilingual (ESB) children must quickly acquire sufficient English to 'survive' interactions with staff, peers and the curriculum. These children face a two-fold challenge: first, learning the language and then using that language to learn. This process takes several years (Windsor & Kohnert, 2004). ESB children attain conversational skills at the level of monolingual peers after approximately two years of L2 exposure. However, it takes considerably longer to learn sufficient English to perform at the same level in academic tasks (Cummins, 1981, 2000; Hakuta, Butler, & Witt, 2000; Kohnert & Bates, 2002; Ramírez, 1992). For example, an Australian study found that the English language abilities of Year 6 ESB children (in their seventh year of consistent English exposure) remained significantly below that of monolingual peers (Hemsley, Holm, & Dodd, 2006).

As speech-language pathologists working in schools, we are only too aware that learning English sequentially can affect a child's ability to interact with the curriculum. Different language experiences, fewer language opportunities as well as distribution of linguistic knowledge and exposure across two languages affect classroom performance. Windsor and Kohnert (2004) conclude that ESB children 'face some of the same academic and social challenges as do monolingual children with language impairment' (p. 878). The teachers we work with on a daily basis are well aware of these challenges. Considerable research exists into the pedagogy of educating bilingual children in an attempt to identify best practices for enhancing curriculum learning.

L1 development is a significant factor influencing L2 acquisition. It is well established that children with a strong L1 acquire L2 more effectively (Kohnert, Yim, Nett, Kan, & Duran, 2005; Restrepo et al., 2010; Rolstad, Mahoney, & Glass, 2005; Thordardottir, 2010; Tsybina & Eriks-Brophy, 2010). Time spent using L1 does not impede L2 language or academic development. In fact, promoting L1 development can significantly improve L2 language abilities and academic results as well as socio-emotional outcomes (Cummins, 1981; Kohnert, 2008; Portes & Hao, 2002). For this reason, bilingual education programs that provide education in both L1 and L2, generally, produce better L2 outcomes. A meta-analysis of 17 studies into the effectiveness of bilingual versus all-English educational approaches for English language learners concluded that bilingual education is 'superior to English only approaches in increasing measures of students' academic achievement in English and the native language' (Rolstad et al., 2005, p. 590). Similarly, a review of 16 studies evaluating bilingual versus English-only reading instruction strongly favoured bilingual approaches (Slavin & Cheung, 2003).

## **The challenge of bilingual education in an Australian context**

While bilingual language programs exist in the USA, Canada and Europe, their application in an Australian context is more challenging. One consequence of Australia's strongly multicultural society is that several cultures and languages frequently co-exist in a single

school. However, cultural clusters exist that could allow implementation of bilingual educational approaches. Unfortunately, no cost-benefit analysis of bilingual education has occurred in this context, even where bilingual staff members are available. Consequently, three factors remain unexplored:

- (1) Whether students would benefit from a bilingual program;
- (2) How such a program would be presented; and
- (3) How much bilingual input would be necessary to improve learning outcomes for ESB children.

With no empirical evidence to support claims to the contrary, Australian schools operate on an implicit assumption that immersion in English is the only feasible option for effective L2 acquisition by ESB children. Often first language abilities are disregarded, albeit in an attempt to help ESB children 'catch up' to their monolingual peers. Clarkson's (2007) considerable research in the area of bilingual versus monolingual mathematics learning highlights this dilemma:

Until recently, there was little recognition by teachers in Australian schools that language can influence the learning of mathematics, and even less thought given to the notion that a student's non-English language may be important. If there was such recognition then the naive position was taken that the first language was somewhat irrelevant... Most teachers were also not aware that their bilingual students would switch languages while thinking about their class work... Of course when teaching children from such diverse backgrounds with the pressures of 'keeping the classroom going', it is not always easy to see such issues as important. (p. 192)

The assumption that English immersion is the most feasible means for Australian ESB children to acquire English at school needs critical examination. Superior outcomes produced by bilingual education approaches in other countries should not be ignored. Schools with large numbers of ESB children from one cultural background provide a suitable environment in which to trial bilingual educational approaches in an Australian context. Research into the value of such approaches, applying 'the wisdom of doing rigorous trials to avert the considerable waste of governments' and families' resources' (Wake et al., 2011, p. 4) is a necessary first step.

This study investigated whether bilingual instruction could enhance L2 acquisition in an Australian context. Specifically, a short period of bilingual mathematics instruction was trialled. This subject area is language rich: 'learning mathematics also involves learning the language of mathematics' (Monaghan, 2009, p. 14). In their first years at school, young students will initially develop mathematics-specific vocabulary and syntax. This process involves far more than learning words. Each word must be linked with the concepts and ideas which underpin its meaning (Lindsay & Gaskell, 2010). As students engage with the curriculum, they develop networks of conceptual knowledge that lead to the use of mathematical discourse: an ability to explain ideas, describe patterns and generalise conceptual knowledge across contexts (Moschkovich, 2005). The process of mapping language to underlying conceptual knowledge is now understood to be a 'crucial issue in mathematics teaching' (Clarkson, 2009). How to best approach this process when a student speaks two or more languages is still being explored (Barwell, Barton, & Setati, 2007).

In this study, mathematics instruction was provided equally in L1 and L2. It was hypothesised that children would use their knowledge of L1 mathematics concepts as a bridge to learn mathematics vocabulary and concepts in L2. Previous studies suggest bridging from L1 to L2 is a valid strategy for promoting L2 acquisition (e.g., Lindsay & Gaskell, 2010; Lugo-Neris, Jackson, & Goldstein, 2010; Ryan, 2005; Ulanoff & Pucci, 1999). We predicted that consolidation of knowledge across languages would produce better English learning outcomes for ESB children compared to ESB children receiving instruction in English alone.

## Method

### *Participants*

The study was conducted with children from a single suburban primary school. The Socio-Economic Indexes for Areas (index of relative socio-economic advantage and disadvantage) placed the suburb in the 49th percentile (Australian Bureau of Statistics, 2006b). This means the area was in the middle socio-economic range when considering factors such as income, education, qualifications and occupation.

The target school was selected for its cultural and linguistic diversity. A high proportion of sequentially bilingual students had an L1 of Samoan. The school reported that 30% of its students had a Samoan cultural background while 12% were Indigenous Australian and 8% were Vietnamese. A further 5% were from a range of other non-English-speaking backgrounds.

The school had 83 children in their second year of full-time education (Year One). These children were in four classrooms, each with a monolingual English-speaking teacher. Of the 83 children in Year One, the school identified 18 children as being eligible for participation in the study. These students came from families where Samoan was the primary language used in the home environment. No students with diagnosed disabilities or sensory impairments were included. All 18 students returned parent consent forms enabling their participation in the study.

Once parental permission was obtained, home language use was confirmed through parent interview. These were conducted in person or over the phone, using a Samoan interpreter if necessary. All parents reported that L1 continued to be the primary language spoken at home, although many noted that conversations with siblings and bilingual friends were spoken in a mix of L1 and L2.

The 18 Samoan–English participants were sorted randomly into two groups: intervention and control, with nine students in each group. The intervention group received mathematics instruction in Samoan and English during the study. The control group received all mathematics instruction in English. At initial assessment, the intervention group had a mean age of 69.2 months (range 65–73 months) and comprised six males and three females. The control group had a mean age of 67.2 months (range 57–72 months) and consisted of five males and four females.

A registered, bilingual teacher was recruited to teach mathematics to the intervention group for the duration of the study (nine weeks). The teacher had been working in the school district for several years and was actively engaged in Samoan cultural programs in her local school and community. She was employed to teach mathematics to the intervention group for 45 minutes twice weekly. Time was also allocated for planning and preparation of sessions, as well as regular collaboration with Year One teachers.

## Assessments

We obtained baseline data using two standardised assessments: the Boehm Test of Basic Concepts-3 (Boehm) and the Test of Early Mathematics Ability-2 (TEMA). These were administered in the week prior to commencement of the intervention block. Standardised tests are by their very nature culturally and linguistically specific. Interpretation of results depends on the degree of similarity between the child being assessed and the standardisation group (Battle, 2002). Boehm and TEMA were designed for monolingual English children. Raw scores were not converted to standard scores/percentile ranks because of the limited relevance of the normative samples to the cultural background of the Samoan–English students in this study. Their limited exposure to English is likely to mean that much of their conceptual knowledge would remain tied to their first language (De Lamo White & Jin, 2011). For these reasons, analyses focused on raw score changes over time.

We administered the Boehm Test of Basic Concepts-3 (Boehm, 2001) individually. It tested comprehension of 50 basic concepts relating to qualities of objects or people, spatial relationships, time and quantity. This included concepts such as before; after; whole; half; second; last; some; few; beginning; between; different; forward; least and equal. These frequently occurring concepts are foundational knowledge for a student to ‘understand the lessons and instructions the teacher presents in the classroom’ (Boehm, 2001, p. 2). Boehm was selected for inclusion in the assessment battery as many of the concepts tested related directly to the mathematics curriculum taught during the study. When completing Boehm, students listened to a focus sentence (e.g., ‘Look at the children and the rope’) followed by a short instruction containing a key concept (e.g., ‘Circle the child who is going over the rope’). For each item, students made a choice from four options: three distractors and one correct choice.

The Test of Early Mathematics Ability-2 tests mathematical skills in children 3–8 years of age (Ginsburg & Baroody, 2003). This test was also administered individually. TEMA assesses informal and formal knowledge, including number awareness, number comparisons, numerical literacy, number facts, basic calculations and conceptual understanding (Ginsburg & Baroody, 2003). The 65-item assessment is hands on and interactive, although basal and ceiling rules mean that not all items need to be administered. Typical items for the children in this study included: finger displays up to 5; counting out loud; identifying which group had more/less objects; counting objects and giving a cardinal number; making groups of objects; reading or writing numerals; naming the number before/after X; and solving simple number stories (e.g., Joey has one dollar and he gets two more. How many does he have altogether?).

## Intervention

In the Year One classrooms targeted for intervention, mathematics lessons took place four times a week. Each class followed the same program, with teachers collaboratively planning curriculum targets and activities for each week of the term. Some lessons included ‘paper and pen’ worksheets, although more frequently lessons involved demonstration of concepts and ‘hands on’ group activities. Appendix 1 contains an outline of weekly topics and key concepts targeted for the duration of the project. Regular liaison with class teachers throughout the term ensured that weekly activities remained in line with the written program.

Curriculum planning at grade level made consistency of program delivery between classrooms and the intervention group relatively easy to coordinate. The intervention group received the same instruction and participated in the same activities at the same time as their peers in the classroom. The only difference was that the intervention group participated in two lessons a week in Samoan rather than English. For the other two mathematics sessions each week, the intervention group stayed with their class and completed the lesson in English. As one topic was targeted for each week of term (see Appendix 1), the intervention group experienced activities relating to target concepts in both Samoan and English. The control group experienced activities only in their second language, English.

The intervention program commenced the week following baseline assessment and lasted for nine weeks. The bilingual teacher visited the school on Tuesdays and Fridays when all four Year One classes participated in mathematics lessons concurrently. The intervention group would withdraw to a room adjacent to the Year One classrooms to complete their lesson in Samoan. Each lesson lasted for 45 minutes. No child in the intervention or control groups missed more than two of the eighteen planned sessions.

One of the authors observed the Samoan sessions, and specifically, language use patterns between the teacher and students. The Samoan teacher spoke Samoan at all times: from the time they left their classrooms to their return 45 minutes later. It was the language of teaching as well as general conversation, e.g. discussing weekend activities on the way to intervention sessions; directing a student to turn on the fans or asking a student to obtain specific materials from the cupboard. English words were only used if there was no direct Samoan translation. Students were encouraged to speak in Samoan during the lessons, but this was not required. All verbal contributions were accepted regardless of whether they were given in Samoan, English or a mix of both. If a child answered a question or contributed to a discussion using English, the teacher at times repeated their response in Samoan, but then the lesson continued in Samoan.

Following the intervention period, all children were re-tested using Boehm and TEMA. To reduce the possibility of test–retest effects, post-intervention assessments were conducted six months following initial assessment (three months following the end of the intervention phase).

## Results

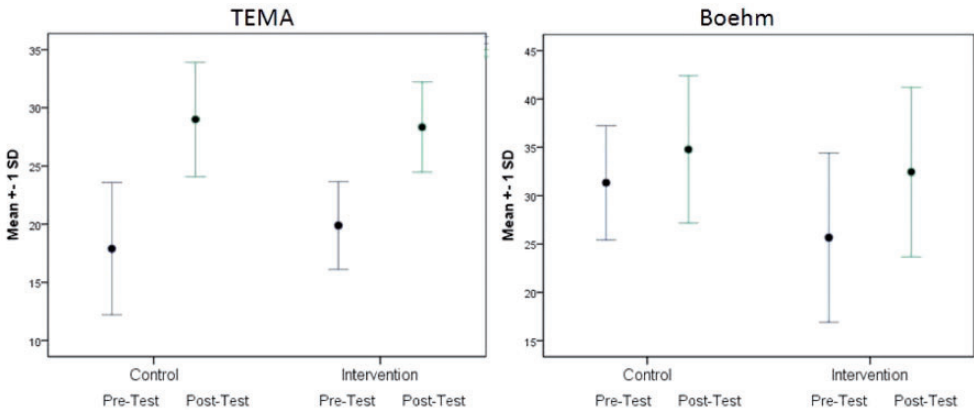
Given the small sample size, this study should be seen as a trial. The results provide guidance on the worth of further research and the findings that one might anticipate. For this reason, we present descriptive statistics, illustrative charts, and some statistical tests.

Table 1 presents the statistics that summarise the results of the testing. Figure 1 portrays the pattern of results graphically.

Table 1 and Figure 1 show that both the control and intervention groups increased their scores substantially from pre-test to post-test. This is confirmed by repeated measures analysis of variance on each of the two measures.<sup>1</sup> The use of parametric analyses of variance followed evidence that normality and homogeneity assumptions were not seriously violated. Kolmogorov–Smirnov tests revealed that the raw scores on TEMA and Boehm were approximately normally distributed ( $p > 0.05$ ). Levene's test revealed

**Table 1.** Pre- and post-test raw scores (SD; range) on TEMA and Boehm tests.

	Intervention group		Control group	
	Mean (SD)	Range	Mean (SD)	Range
TEMA-2				
Raw score pre-test	19.9 (3.8)	15–25	17.9 (5.7)	10–27
Raw score post-test	28.3 (3.8)	21–34	29.0 (4.9)	22–35
Difference score	8.4 (4.2)	2–14	11.1 (2.9)	7–16
Boehm				
Raw score pre-test	25.7 (8.7)	14–43	31.3 (5.9)	19–38
Raw score post-test	32.4 (8.8)	21–48	34.8 (7.6)	21–45
Difference score	6.7 (6.7)	–6–15	3.4 (3.7)	–3–8



**Figure 1.** Pre- and post-test raw scores (mean  $\pm$  1 SD) on TEMA and Boehm tests (graphical representation).

that raw scores on the TEMA and Boehm complied with the assumption of homogeneity of variance ( $p > 0.05$ ).

Repeated measures analyses of TEMA and Boehm raw scores revealed a significant difference on each measure between pre- and post-test scores across the combined intervention and control groups (TEMA:  $F_{1,16} = 134.2$ ;  $p < 0.001$ ; Boehm:  $F_{1,16} = 16.29$ ;  $p = 0.001$ ). Across the two groups, there was a consistent pattern of score improvement from pre-test to post-test.

For TEMA scores; the interaction between group membership and time of testing was not statistically significant ( $F_{1,16} = 2.50$ ;  $p = 0.13$ ), indicating comparable change for each group over time. A similar result was obtained for the Boehm scores ( $F_{1,16} = 1.73$ ;  $p = 0.21$ ). From these data, the evidence is insufficient to support a claim that members of the intervention group improved their scores (on average) to a greater extent than members of the control group.

From Figure 1, it may be noted that there is almost no overlap between the TEMA pre-test and post-test score distributions, but substantial overlap between the Boehm pre-test



and post-test score distributions. Although not statistically significant, these sample differences suggest that a measurable impact is possibly more likely to be achieved on TEMA scores than with Boehm scores. Whether TEMA is more sensitive to the type of teaching that took place in this study, or to teaching in general, warrants further investigation with larger samples, with a longer period of intervention, and/or with less delay between program completion and follow-up outcome measures.

## Discussion

This study evaluated the effect of a nine-week bilingual intervention in the key learning area of mathematics. Nine Samoan–English students received mathematics lessons in Samoan and English. A control group of Samoan–English students received all lessons in English. The material covered and the amount of instruction was the same for each group. The only difference was in the language of instruction.

The school received this program well. Although no formal feedback was obtained, the authors and Samoan teacher noted that the children in the intervention group willingly attended and actively participated in the Samoan lessons. The staff and families involved in the program also provided informal positive feedback to the authors. They described the program as worthwhile and perceived that it had a positive impact in target areas. We attribute these observations to the willingness of the school to support students from culturally and linguistically diverse backgrounds; positive rapport between the Samoan community and the school as well as positive rapport built between the Samoan teacher and staff at the school.

## Group results

Despite enthusiastic support at the school level, the intervention group showed no significant differences in gains to the control group on either Boehm or TEMA. Both the intervention and control groups made significant gains over the six months between initial and repeat testing. That is, all students showed gains on Boehm and TEMA regardless of whether they received instruction in English only, or the bilingual format.

Although TEMA and Boehm both improved over time, analysis of individual scores and means revealed significant differences between the two test formats. Figure 1 highlights the contrasting improvement across tasks. Scores on TEMA at post-testing indicated rapid progress in acquiring mathematical skills across a range of areas. The picture was less clear for their conceptual development, as measured by Boehm. We propose three reasons for the relatively slower growth in conceptual development over time: (1) differences in the skills assessed across tasks; (2) conceptual differences between L1 and L2; and (3) insufficient exposure for consolidation of word learning.

*Differences in the skills assessed across tasks.* TEMA and Boehm assess very different skills. While items in TEMA require some conceptual learning, the majority are rote tasks with finite application (e.g., rote counting, number facts, counting, providing a cardinal number and writing numerals). Once mastered, these skills would be applied across contexts with relative ease. The concepts tested by Boehm are less concrete. In particular, their application can change depending on context, e.g., making comparative judgments, comparisons to a standard, ordering, grouping or classifying (Boehm, 2001). It is logical that this task would

be more challenging for ESB students, who have different language experiences, fewer English language learning opportunities and distribution of linguistic knowledge across two languages (Windsor & Kohnert, 2004).

*Conceptual differences between L1 and L2.* Learning a second language is highly influenced by the presence of a first language: it creates a lens through which the second language is considered (Kellerman, 1995). Conceptually similar words, which can be directly translated from L1 to L2, are easier for sequential bilinguals to learn. Conceptually different words, which cannot be easily translated, take longer to learn in L2 because of differences in conceptual schema/traits between languages (Carroll & Von Stutterheim, 1993; Gaskell & Dumay, 2003; Hemsley, Holm, & Dodd, 2012). For example, the learning of probability vocabulary in Chichewa–English students in Malawi was found to be influenced by the nature of Chichewan probability vocabulary and their differences to English (Kazima, 2007). In this study, conceptual differences between English and Samoan may have directly contributed to the relatively slower learning of English concepts. Many of the English concepts examined cannot be directly translated in Samoan: some are represented using several words together, while others have different conceptual traits and are therefore used in additional/different contexts (Hemsley et al., 2012). It is hypothesised that the conceptual distance between Samoan and English negatively influenced L2 concept acquisition for Samoan–English bilinguals. Further research is needed to confirm these findings.

*Insufficient exposure for consolidated learning.* The bilingual children in this study would have been exposed to many unfamiliar English words in this study. The process of learning new mathematical vocabulary in an unfamiliar language is complex. Each word must be linked with concepts and ideas which underpin its meaning. Links made over time eventually allow students to comprehend that word across a range of contexts (Lindsay & Gaskell, 2010; Moschkovich, 2005), although as concepts can be represented very differently across different languages, this process takes time. In the ‘fast mapping’ stage of learning, students link available conceptual and contextual information to the word they hear (Kan & Kohnert, 2008). The information can be used but is not yet part of their established vocabulary. Consolidated learning requires multiple exposures over several days. Once in the established lexicon, information is more enduring, accessible and networked to other information (Dumay & Gaskell, 2007; Gaskell & Dumay, 2003; Lindsay & Gaskell, 2010). In the current study, the amount or intensity of exposure to new concepts may have been insufficient to allow consolidated learning. A broad range of concepts from Boehm were covered in lessons but were taught in short bursts with limited revision, e.g., shape attributes; comparison attributes; whole and part concepts (see Appendix 1). This type of exposure would have facilitated fast mapping only.

### *Comparison of learning across tasks*

Analysis of group differences between the two assessments revealed a further interesting result. Figure 1 shows that the control group made good progress on TEMA but limited progress on Boehm. In contrast, the intervention group made good progress on Boehm and TEMA. Learning was more balanced in the intervention group: acquisition of mathematical skills was matched by conceptual development, as assessed by Boehm. We propose that



bilingual intervention facilitated consolidated L2 learning, enabling students to more easily link new English words to underlying conceptual knowledge in L1. If the length of the study had been longer, it is likely that:

- (1) The intervention group would have made greater overall gains than the control group, as learning would be underpinned by strong conceptual integration and links to relevant vocabulary in L1 and L2; and
- (2) The control group's learning would be limited by weaker conceptual integration and links to vocabulary in L1 and L2.

These hypotheses are consistent with suggestions that L1 knowledge facilitates L2 acquisition (Lindsay & Gaskell, 2010). We propose that bilingual instruction improved connections between new and existing knowledge in L1 and L2. Bridging knowledge between L1 and L2 established more elaborate representations, with stronger links to conceptual knowledge. This, in turn, facilitated consolidated learning. Further research to confirm this theory with larger group sizes over an extended timeline is necessary. An understanding of mechanisms that facilitate learning for ESB children would have obvious implications for pedagogical policy relating to this increasing population in Australia.

### ***Samoan learning***

Anecdotal reports from the Samoan teacher indicated that the intervention group improved their Samoan mathematical and conceptual awareness over time; however, this was not quantified. Although Samoan assessments would have added valuable information to the data collected, they were not included in this study. Administration of Boehm and TEMA in Samoan was not possible due to linguistic bias and difficulties with direct translation: concepts are represented very differently in Samoan and English.

Importantly, students received 50% of their mathematics education in L1 for a sustained period without any negative effect on English learning. This suggests that bilingual students in Australia may be able to continue to develop L1 at school without impacting on English acquisition. Future studies should include measures in both L1 and L2 to capture cross linguistic learning.

### **Limitations**

This study evaluated learning of mathematical skills and concepts outside the teaching framework, using formal assessment tools. Home-made assessments of target vocabulary and concepts were not used. The selection of formal measures may explain differences between our study and others that evaluate bilingual versus monolingual intervention. Many studies evaluate word and concept learning using specially designed tests, assessing the specific vocabulary targeted in intervention (e.g., Justice, Meier, & Walpole, 2005; Lugo-Neris et al., 2010). While such tests are limited by their assessment of a narrowly defined skill set, their use has identified significantly greater language learning gains following intervention. A study by Tsybina and Eriks-Brophy (2010) bridges these two assessment approaches, looking at learning of target vocabulary as well as generalised learning. It identified that bilingual intervention facilitated learning in targeted areas but

had no generalised effect on overall vocabulary acquisition. This model of assessment, evaluating acquisition of core skills in addition to generalised learning, should be an essential element of future studies.

The small sample size and length of study were further limitations in this project. The sample size was limited by the number of eligible students at the targeted school. A larger sample size would have been more sensitive to small differences in group performance and provided greater confidence in results. The timeframe for intervention was also dictated by practical factors including the length of the school term and availability of the bilingual teacher. Previous research shows that bilingual education is beneficial (Cummins, 1984; Kohnert et al., 2005; Thordardottir, 2010; Tsybina & Eriks-Brophy, 2010); however, in this study, the limited period of intervention might not have been sufficient to generate accelerated learning in the intervention group. A longer intervention block may have produced a different pattern of learning between the groups over time. Further research is required to establish how much of this potentially useful mode of educational delivery is necessary to obtain positive generalised learning outcomes. Trials involving short intensive blocks of intervention, as well as longer more dispersed L1 support would be worthwhile.

## Conclusions

This study was received well by the school, parents and staff. The perceived benefit of the intervention was positive. Initial comparison of scores on individual tasks indicated differences in learning between the two assessment tasks. Over time, students more easily acquired core mathematical skills than the underlying conceptual skills tested by Boehm. This result emphasises the different types of learning typical ESB children encounter. They more easily acquire rote skills and knowledge than conceptual knowledge and its associated vocabulary. The primary challenge for ESB students appears to be integrating L2 concepts into a pre-existing conceptual schema. Acquiring concepts is not a matter of rote learning, rather, consolidation requires multiple exposures over time and cross linguistic transfer of knowledge between L1 and L2.

Initial analysis of tasks in isolation indicated no additional benefit for students who received bilingual intervention. However, unexpected differences in patterns of learning emerged between the intervention and control groups. The control group acquired core mathematical skills but made limited progress acquiring underlying conceptual knowledge. In contrast, the intervention group demonstrated more balanced learning: acquisition of core mathematics skills was matched by gains in underlying conceptual development. We propose that bilingual intervention facilitated L2 consolidated word learning, resulting in improved learning of core skills linked to underlying conceptual knowledge. Further evaluation of bilingual bridging interventions is necessary to confirm this pattern of learning in Australian ESB children.

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## Declaration of conflicting interests

None declared.

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## Note

1. In the repeated measures analyses, the between-subjects factor is Group (Control versus Intervention); the within-subjects factor is Time of Testing (pre-test versus post-test). The test of significance of the interaction between Group and Time of Testing is logically and statistically equivalent that of the differences between the mean gain scores of the two Control and Intervention groups.

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## Appendix I

Topics and key concepts targeted during the intervention program

Week	Target topic and concepts
1	Topic: 2D shapes Key concepts: circle, triangle, rectangle, oblong, square, large, small, straight, curved, match, does not match, same, exactly, not the same, different, sort, sides, corner
2	Topic: Addition number stories to ten Key concepts: count, makes, and, how many, how many altogether, add, count, count on, more, is equal to, get
3	Topic: Comparing attributes Key concepts: match, belong, long, longer, short, shorter, heavy, heavier, light, lighter, big, bigger, little, littler, tall, taller, wide, wider, narrow, narrower, close, closer
4	Topic: Addition number stories to ten Key concepts: count, makes, and, how many, how many altogether, add, count on, more, is equal to, get, equal
5	Topic: Whole and part Key concepts: whole, part, parts, slice, piece, bit, complete
6	Topic: Addition number stories to ten Key concepts: count, makes, and, how many, how many altogether, add, count on, more, is equal to, get
7	Topic: Whole and part Key concepts: whole, part, parts, slice, piece, bit, complete, break, cut
8	Topic: Addition number stories to ten Key concepts: count, makes, and, how many, how many altogether, add, count on, more, is equal to, get
9	Revision

# Chapter 7

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## Thesis Discussion and Conclusions

## **7.1 Introduction**

This chapter summarises the major findings of the studies reported in this thesis as they relate to the aims and hypotheses of the study. It links the findings to theoretical issues regarding typical and atypical bilingual language development and discusses clinical implications for speech-language pathologists working with bilingual children.

## **7.2 Review of the Major Questions**

My first investigation into ESB language development in Australia took the form of a descriptive study (see Appendix 1: Hemsley, et al., 2006). This explored the English language skills of ESB children in comparison to monolingual peers. Children were assessed in year six when they were 11 years old, and had at least six years of exposure to English. In the literature, this amount of L2 exposure reportedly produces L2 dominance (Kohnert & Bates, 2002; Magiste, 1992) allowing children to perform at the same level as their monolingual peers in the classroom (Cummins, 1981; Cummins, 1984; Hakuta, et al., 2000; Ramírez, 1992). The year six descriptive study investigated whether these findings could be replicated in an Australian context.

The year six study produced three key findings:

- There were no differences between the English lexical skills of two ESB groups (Vietnamese-English and Samoan-English).
- The ESB groups performed significantly below their monolingual peers in all lexical tasks but not on non-word tasks.
- The ESB groups demonstrated incomplete English acquisition even though they were typically developing students achieving pass or higher grades in the classroom.

These findings provided the catalyst for this thesis. They raised three questions explored in the three sections of this thesis:

- What are the features of typical L1 and L2 lexical development in Australian ESB children?

- How can assessment validly differentiate language difference from disorder in Australian ESB children?
- Can targeted intervention enhance L2 learning for Australian ESB children?

The studies within this thesis built on existing literature from a diverse range of disciplines: speech-language pathology; linguistics; psychology; and education. Each field examined lexical development in ESB children but drew from different theoretical perspectives with embedded assumptions. While often not stated explicitly in the literature, these perspectives were implicit in research questions and methodologies, as well as in the interpretation of data. Each provided insight and perspective to help explain and understand the findings.

This chapter uses the Dynamic Interactive Processing (DIP) framework of language (Kohnert, 2008, 2013) to draw together the findings, theories, and literature associated with this thesis. As discussed in chapter 1, the DIP framework is a “clear, unifying conceptualization of language... necessary to support clinical decision making with linguistically diverse populations” (Kohnert, 2013, p. 13). This explicit link between theory and practice is consistent with the principles and goals of this thesis. Two types of interactions suggested within the DIP framework provide the structure for the discussion of each key question. First, interactions between language and the language learning context are considered. Second, interactions between language and other cognitive systems within the learner are discussed. Considered in parallel, these interactions enable comprehensive consideration of language difference versus disorder in Australian ESB children.

### **7.3 Question 1. What are the Features of Typical L1 and L2 Lexical Development in Australian ESB Children?**

#### **7.3.1 Findings**

A longitudinal study investigated L1 and L2 lexical development in Samoan-English, a language pair rarely studied. Nine ESB children and matched monolingual controls were assessed on four occasions during their first two years at school. Specially designed tools were used to assess receptive and expressive lexical development in L1 and L2. Chapter 2 analysed the data relating to lexical size (using composite scoring methodology) and lexical composition (through analysis of singlet and translation equivalents). Clear patterns of ESB development were revealed:



- L1 and L2 improved significantly over the two years;
- composite scores were a better indicator of overall lexical ability than scores in L1 or L2 alone;
- passive bilingualism produced composite scores comparable to monolingual scores on the receptive task, but significantly lower than monolingual scores on the expressive task; and
- initially the children had more singlets than TEs, but over time, the number of singlets reduced and TEs increased.

A further study identified the significance of word type for lexical learning in Samoan-English bilingual children (chapter 3). The receptive and expressive vocabulary tasks evaluated acquisition of four word types: cognates, matched nouns, phrasal nouns, and holonyms. Each word type had varying phonological and conceptual difference between Samoan (L1) and English (L2). Word learning processes (Lindsay & Gaskell, 2010) led to predictions that word types with conceptual/phonological similarity would show faster uptake than those with greater conceptual/phonological distance. Investigation of word learning over time indicated that:

- L1 knowledge influenced L2 word learning;
- conceptual distance affected word learning more than phonological distance;
- children acquired L2 lexical items earlier if the conceptual representation was similar in L1; and
- children acquired words with greater conceptual distance between L1 and L2 (phrasal nouns and holonyms) more slowly than words with conceptual similarity.

### **7.3.2 Interactions Between Language and the Language Learning Context**

The DIP framework emphasises dynamic interaction between language and environment. Interplay between these systems was a key consideration when exploring typical lexical development in Australian ESB children. The longitudinal study investigated changes in L1 and L2 at a point of a major change in the language learning context: commencement of regular, consistent exposure to English at school. In a dynamic interactive processing framework (and drawing on tenets of dynamic systems theory) this commencement period

creates instability in the L1 and L2 lexical systems (De Bot, Lowie, & Verspoor, 2007). This instability provides the learner with the capacity to integrate a new language into an existing conceptual system but it can also make L1 vulnerable because of comparatively reduced interaction in that language (Kohnert, 2013). In the longitudinal study, the effect of this instability on the developing lexical system was clear in three areas: L1 development; L2 development; and patterns of language use across L1 and L2.

#### **7.3.2.1 L1 development**

Introduction of a second language can have varied effects on a child's L1 development. Some studies reported a decline or plateaux in L1 abilities over time (Kan & Kohnert, 2005; Leseman, 2000; Wong Fillmore, 1991). Other studies reported little or no L1 decline (Cummins, 1981; Cummins, 1984; Hakuta, et al., 2000; Ramírez, 1992). These varied findings support the concept that L1 is an unstable subsystem within the bilingual learner, with small differences between individuals having potentially significant effects on learning outcomes (De Bot, et al., 2007).

In the longitudinal study (chapter 2), the Samoan-English bilingual group demonstrated significant L1 growth over the research period despite increased exposure to English. Closer examination of the language learning context helps to explain this finding. Samoan language skills may have been less vulnerable to decline because of established, ongoing interactions with family members and extended family, as well as embedded community opportunities for L1 interaction. L1 development may also have been supported by a value of L1 in the homes and wider community of the children studied (Kan & Kohnert, 2005; Kohnert, 2013).

#### **7.3.2.2 L2 development**

Regular, consistent exposure to a second language introduced into the language learning environment of a young child, leads to rapid L2 growth (Hakuta, et al., 2000; Ramírez, 1992; Schaeerlaekens, et al., 1995). In the longitudinal study, increased exposure to English at school was expected to have a significant impact on L2 growth over time. Growth in English was expected to be greater than in Samoan. However, results revealed no significant difference in Samoan and English receptive lexical growth over time. Both languages showed significant growth.

The language learning context plausibly explains this result. Parent questionnaires indicated that exposure to English began prior to school, with a mix of English and Samoan being used during everyday interactions at home. Possibly, the increased exposure to English at school

did not significantly change the way cognitive resources were distributed for L1 compared to L2 learning. This produced ‘balanced’ receptive growth across languages.

### **7.3.2.3 Patterns of L1 versus L2 use**

An unexpected finding in the Samoan-English bilingual group was the significant difference between L1 receptive and expressive scores. Receptive vocabulary was well developed with good improvement in scores over time. Conversely, expressive vocabulary scores revealed limited *use* of Samoan vocabulary. Although Samoan picture naming did improve over time, mean scores remained low.

This finding was less surprising in light of the language learning context of the group studied. Parent questionnaires consistently indicated that children predominately used English at home even though the adults used Samoan as their primary language. Although the children understood their parents’ Samoan, they responded in English. Because parents had at least minimal competence in English, the mixing of Samoan and English was not reported to negatively affect communication between parties. The fact that parents did not require their children to use Samoan may be due to the significant status of English in Samoan culture (for example, as the language of education). Low scores on Samoan spoken tasks in this study therefore appeared to reflect a cultural acceptance of English use at home and subsequent limited experience using L1.

This type of ‘passive’ L1 development, characterised by receptive competence but limited expressive ability, has previously been reported in an Australian context (Borland, 2006). The Dynamic Systems notion of finite resources contains a theoretical explanation of passive L1 development consistent with the DIP framework (De Bot, et al., 2007). It appears that the ESB children in this language learning context allocated their limited internal resources (including memory, time to spend on learning, internal information resources and motivation) to understanding Samoan but using English. Their focus on improving communication in L2 improved communication within the target environment but made the L1 expressive lexicon vulnerable (Kohnert, 2013). This had a demonstrated negative effect on L1 expressive lexical development.

### **7.3.3 Interactions Between Systems Within the Learner**

The longitudinal study provided a unique opportunity to explore the dynamic nature of internal systems at play in ESB children during the first 18 months of regular, consistent L2

exposure at school. Composite scoring methodology enabled examination of the size and content of L1 versus L2. Further analysis of L2 word learning according to word types investigated interactions between L1 and L2 with an increased focus on the conceptual system.

### 7.3.3.1 Lexical size across L1 and L2

The use of composite scoring in the longitudinal study examined interactions between L1 and L2 in the ESB learner. Across tasks and time-points, the bilingual group consistently produced higher composite scores than those achieved in either Samoan or English. This resulted in a more meaningful measure of the bilingual group's total lexicon.

Bilingual composite scores mirrored monolingual (English only) scores over time on the receptive vocabulary task. This finding was consistent with those of Pearson, Fernández and Oller (1993) who also reported a close correlation between monolingual and bilingual patterns of lexical growth using composite measures. The similarity between monolingual scores and ESB composite scores again points to the notion of finite resources (De Bot, et al., 2007). It suggests that typically developing ESB children allocate their limited internal resources to learn new words at the same rate as their monolingual peers. Importantly, the presence of two lexicons does not appear to use additional cognitive resources and therefore place ESB children at a disadvantage for word learning. This is in direct conflict with more traditional viewpoints that suggest that bilingual children take longer than monolingual children to develop vocabulary because of the cognitive load of two languages (De Bot, et al., 2007).

Similarities between monolingual vocabulary scores and ESB composite scores did not extend to the *expressive* vocabulary task. The Samoan bilingual group's composite picture naming scores were consistently low compared to their monolingual peers. Rather than providing evidence of disorder this result reflected the typical development of this group as passive ESB learners. As described above, it appears that the allocation of language learning resources reflected limited motivation to use L1. In addition, limited exposure to L2 language models (primarily from the classroom and other ESB children's English) may have influenced overall expressive abilities relative to monolingual peers. A similar pattern would not be expected in actively bilingual children who understand and use L1 in the home environment. This environment would theoretically provide relatively greater resources for

supporting expressive language development. Further research is necessary to clarify differences in lexical growth in active versus passive bilinguals.

### 7.3.3.2 Lexical composition

An important tenet of the DIP framework is that language emerges through interactions with other systems and subsystems. A range of models attempting to describe the bilingual lexicon (largely based on Connectionist Theory) highlight this complexity (Kroll, Van Hell, Tokowicz, & Green, 2010). Like monolingual models, bilingual models consider lexical representations at three levels: conceptual, lexical and phonological (Costa, Santesteban, & Caño, 2005; Kroll, et al., 2005).

Evidence suggests that information stored at the conceptual and phonological levels is shared across languages and is not language specific. Conversely, the lexical level is thought to be language specific, with conceptual information linking with corresponding but separate L1 and L2 representations (Kroll & Stewart, 1994; Kroll, et al., 2005). This means that ESB children learn and add words to two separate but interrelated lexicons. Some representations will be unique to L1 or L2 (singlets). Others words, known as translation equivalents (TEs), are found in both L1 and L2. In the longitudinal study, composite scoring enabled examination of lexical composition between languages over time.

The ESB group showed different TE and singlet profiles at first and second assessments on the Receptive Vocabulary task. Initially, singlets dominated lexical composition with very few TEs. Over time, TEs significantly increased, with a corresponding decrease in singlets. Previous studies have also reported this pattern in both simultaneous bilingual children (e.g., Marchman & Martinez-Sussmann, 2002; Pearson, et al., 1993; Peña, et al., 2002) and ESB children (Kan & Kohnert, 2005).

These findings indicate that for ESB children in the early stages of second language exposure, L2 development is not mediated through interaction with L1. That is, children do not attempt to build L2 by looking for L1 translations (Peña, et al., 2002). Rather, word learning appears to be conceptually mediated: the focus is on linking new lexical representations to conceptual knowledge in the context in which they are learned. This interaction between the conceptual and lexical systems has the distinct advantage of allowing children to add words to L2 that may not yet have a lexical representation in L1 and vice versa.

Over time, children learn to link conceptual knowledge to lexical representations across languages. This strengthens links between L1 and L2. The result is an increase in the number of TEs relative to singlets. In the longitudinal study, this switch from singlet to TE dominance occurred between 12-18 months of regular consistent exposure to English at school.

#### **7.3.3.3 The importance of the conceptual system in word learning**

Investigation of lexical composition suggested that word learning in ESB children is conceptually mediated. Chapter 3 investigated this dynamic interaction further. The findings provided the first concrete evidence that the conceptual system (which is not language specific) has a direct impact on L2 word learning in ESB children. L2 lexical items were acquired earlier if their conceptual representation was similar to that in L1. Words that did not fit existing L1 schemas, or words that required a conceptual shift from L1, took longer to learn and consolidate in the L2 lexicon. This finding confirms that ESB children use existing knowledge and resources when developing new lexical footprints (Gaskell & Dumay, 2003). The finding is consistent with current connectionist models of bilingual language and supported within a DIP framework. For example, Kroll and Stewart (1994) “identified the relative strength of the connections between words and concepts as important to understanding the way in which L2 learners and bilinguals perform ordinary language processing tasks” (Kroll, et al., 2010, p. 379).

### **7.4 Question 2.**

#### **How can Assessment Validly Differentiate Language Difference from Disorder in Australian ESB Children?**

##### **7.4.1 Findings**

Language difference describes a typical pathway towards bilingual competency. In contrast, language disorder describes a core deficit with language learning. Chapter 4 of this thesis explored the process of assessing ESB children to discriminate language difference from disorder. Challenges associated with this process were highlighted in the cases of two school age ESB children. The cases suggested two essential standards for diagnosis of bilingual language disorder in an Australian context:

- use of assessment techniques other than formal assessments; and
- implementation of a range of culturally sensitive assessment techniques – such as composite scoring, peer-child comparative analysis, or dynamic assessment.

Chapter 5 presented the case of an ESB child who presented with an unusual pattern of language disorder. Peter acquired Vietnamese (L1) at home and came into regular contact with English (L2) when he started school (at four years of age). Assessment at eight years of age revealed intact Vietnamese language abilities concurrent with significantly impaired English development. Poor lexical development, underspecified lexical templates and inhibited access to lexical knowledge characterised Peter’s English difficulties. Peter’s case is controversial in that it challenges the previously unquestioned assumption that diagnosis of disorder requires evidence of disorder in *both* languages of a bilingual child (Gutiérrez-Clellen & Simon-Cereijido, 2009; Kohnert, 2010; Speech Pathology Australia, 2009).

Theoretical certainty must underpin our understanding of language disorder in ESB children and drive change in clinical practice. The DIP framework emphasises this translation. It draws on a range of compatible theories to “support and guide assessment or intervention with bilingual individuals with language disorders” (Kohnert, 2013, p. 13). As such, it provides a powerful construct for drawing together the theoretical and practical findings from chapters 4 and 5. The result is a series of theory embedded guidelines for valid and reliable assessment with ESB children in an Australian context: selection of assessment techniques to match the language learning context of each child; the use of multiple measures to evaluate L1 and L2; a shift from competence-based assessment measures to dynamic assessment of language learning potential; and increased consideration of cognitive systems necessary for language processing and development. These will now be discussed.

#### **7.4.2 Interactions Between Language and the Language Learning Context**

Traditional competence-based language assessment tools focus on measuring acquired skills in targeted areas such as morphology, expressive vocabulary, sentence construction and sentence comprehension. These tools are used widely and form a foundation for SLP practice. Despite this, reliance on these measures is in many ways incompatible with the DIP framework of language. One reason for this is the strong focus on a child’s language performance without considering the language learning context. This applies equally to monolingual and bilingual children. For example, in young monolingual children, low

language scores can be the result of limited exposure to oral language and literacy. Alternatively, it can be the result of an underlying difficulty with the language learning system. Competence based measures are simply not sensitive in discriminating between the two.

Consideration of the language learning context is essential for discriminating language difference from disorder in ESB children. Clinicians need to select assessments and interpret available data in the light of each child's language learning context. Consideration of both L1 and L2 is critical.

#### **7.4.2.1 Matching Assessment Techniques to the Language Learning Context**

Description of a child's language environment and patterns of language use are essential when assessing bilingual children (De Lamo White & Jin, 2011; Hammer, et al., 2004). Throughout the single cases presented in chapters 4 and 5, case history information provided a valuable foundation for considering each child's language abilities. All children assessed were from an ESB background, however, each was unique. Rather than a 'cookie cutter' approach to assessment, each child was assessed differently according to their unique language learning context.

The most obvious example of matching assessment choice to the language learning context was in the avoidance of standard scores associated with formal tests. ESB children generally bear little similarity to the standardisation sample on such tests, even after several years of consistent exposure to L2 (Battle, 2002; Hemsley, et al., 2006; Kohnert, et al., 2009; Laing & Kamhi, 2003). For this reason, formal assessments are diagnostically inadequate and inappropriate for differentiation of language difference from disorder (Caesar & Kohler, 2007; De Lamo White & Jin, 2011; Williams & McLeod, 2012).

Although some formal assessments were administered in the cases presented, these were used to profile language strengths and weaknesses over time and to assist with development of intervention goals. In many ways, the data produced by these tests produced more questions than answers. For example, limited growth in scores related to intervention targets was difficult to interpret: evidence suggests that children can acquire language skills in intervention without a corresponding change in standardised test performance (Haynes & Pindzola, 2008).



Further, some persistent error patterns may have represented language difference. For example, following intervention Luka (chapter 4) continued to demonstrate morphological and grammatical errors in sentences. While this presentation would be problematic in a monolingual child, its meaning in a bilingual context is more complex:

*...although there are presumably different reasons for the groups' performances, monolingual English-speaking children with SLI have been found to make the same kinds of morphosyntactic errors and to show overlapping performance in picture naming and listening span tasks as typical children learning English as a second language (Windsor & Kohnert, 2009, p. 446).*

In Luka's case, grammatical errors appeared to be part of his typical ESB development. The types of errors (tense and pronoun markers) were typical of Samoan-English ESB language learners. In addition, grammatical errors did not dominate his narrative, with many t-units demonstrating sound grammatical morphological development. This pattern was therefore not considered indicative of SLI. As such, formal test scores provided no concrete information regarding the presence or degree of disorder. The cases confirm that, for diagnostic purposes, formal tests are of little value for ESB children.

A second research area where the language learning context influenced assessment was in choices regarding L1 assessment tools. For example, Antony (chapter 4) presented with a passive pattern of L1 use. As described above, this means he was able to understand L1 but demonstrated limited expressive use at home (Borland, 2006; Pease-Alvarez, 2002).

Consequently, a receptive vocabulary tool was selected to obtain L1 data using composite scoring methodology. As Antony used very little Vietnamese, an expressive vocabulary assessment would not only have been inappropriate but also a waste of valuable clinician and interpreter time. Without information regarding Anthony's passive L1 use, L1 expressive vocabulary may well have been tested and incorrectly interpreted as evidence of disorder.

In contrast, case history information obtained regarding Peter (chapter 5) indicated active, ongoing use of L1 at home and school. Receptive composite scoring measures indicated a strong L1 receptive vocabulary while anecdotal information indicated that he was able to speak well in his first language. For this reason a narrative sample in Vietnamese was obtained. This enabled a direct comparison of sentence production in L1 versus L2 and, in this context, provided valuable evidence that Peter's L1 was indeed intact.

### 7.4.3 Interactions between Systems Within the Learner

Assessment choices are available for ESB children, however, decisions should be based on each child's unique cultural and linguistic background. Decisions regarding assessment should also consider factors *internal* to the child. Many competence-based assessment tools are inconsistent with the DIP framework because they collect data regarding current performance on a particular language task at a single time point. They do not evaluate a range of systems and subsystems in the bilingual learner, nor do they assess a child's potential to learn and process language. Alternative assessment protocols consistent with a DIP perspective of language include use of multiple measures to evaluate the bilingual language system, a focus on the process of language learning rather than the product, and consideration of cognitive systems interacting with bilingual language systems.

#### 7.4.3.1 Using Multiple Measures to Evaluate the Bilingual Language System

Diagnosing language disorder in ESB children requires the use of multiple assessment techniques to collect a strong body of evidence. Importantly, data should be collected from both L1 and L2. This standard has two strengths, each consistent within a DIP framework of language. First, it overcomes the weak theoretical support and/or research validation for any single assessment technique to differentiate difference versus disorder in ESB children. Second, it acknowledges that assessment in just one of a bilingual's languages does not take into account overall language functioning. While each assessment task provides valuable data, diagnostic strength comes when the tasks, considered together, create a profile of difference or disorder. Further research to develop diagnostic power and specificity with ESB children is vital.

Composite scoring highlights the need to use more than one assessment technique with bilingual children. Used extensively throughout this thesis, this methodology has great potential for providing valuable information regarding L1 and L2 lexical development in the absence of normative data for a particular language pair. Its ability to be used with existing receptive or expressive vocabulary tasks also offers flexibility. The findings reported in a range of studies (including chapter 2 of this thesis) indicate the diagnostic power of composite scoring, with certain patterns of performance indicating disorder (Bedore, et al., 2005; David & Li, 2005; Kan & Kohnert, 2005; Marchman & Martinez-Sussmann, 2002; Pearson, 1998; Pearson, et al., 1993).

Despite these advantages, composite scoring should never be used in isolation to diagnose language disorder. This is primarily because composite scoring does not evaluate the full range of language systems and subsystems consistent within a DIP framework. For example, composite scoring tests only lexical development: other domains, such as syntax and morphological development, are not considered. In addition, composite scoring evaluates the lexicon at word level: lexical skills at sentence and discourse levels are not evaluated. Finally, it is a static assessment, measuring current vocabulary skills rather than word learning potential in the developing bilingual.

Composite scoring is a useful assessment technique in the early years of L2 exposure. Its use with bilingual children of all ages however is questionable. Monolingual children with language impairment often demonstrate slow lexical acquisition, however, these difficulties diminish over time, with many children eventually performing within the average range (Bedore & Peña, 2008; Spaulding, Hosmer, & Schechtman, 2013). Over time, it would be expected that evidence of slow L2 lexical acquisition would also diminish for ESB children (Bedore & Peña, 2008), making composite scoring a redundant measure for diagnostic purposes. It is for this reason that composite scoring was not used in the single case assessment of Luka (chapter 4), who had eight years of regular consistent, English exposure. Again, this decision highlights the importance of matching bilingual assessment techniques to the individual child.

#### **7.4.3.2 A shift in focus from product to process**

Drawing on tenets of Social Constructivism, General Interactive Processing and Dynamic Systems Theories, researchers increasingly suggest a shift in focus from competence-based assessments to measures of the efficiency of language and associated cognitive systems (e.g., Ellis Weismer & Evans, 2002; Kohnert, 2013; Windsor & Kohnert, 2009).

*This emphasis on the process as opposed to product or outcomes provides the evaluator with a measure of the individual's speed, accuracy, or efficiency in learning or processing language during real time (Kohnert, 2013, p. 7).*

This shift in focus is consistent with the DIP framework. Current literature discussing processing speed, attention and perception (Gillam, et al., 2009; Restrepo, et al., 2011; Windsor & Kohnert, 2009) indicates that, in the future, assessment and intervention may change to focus on “fundamental cognitive functions underlying child language disorders” (Windsor & Kohnert, 2009, p. 455). For the time being, assessments that evaluate the

potential of the cognitive system to learn and process language are available and provide preferable measures for differentiating language difference from disorder in bilingual children.

One such measure used in chapters 4 and 5 is dynamic assessment (DA). This assessment technique evaluates a child's language learning potential. Increasingly, research shows this measure to be a strong diagnostic tool when identifying language disorder (Gutiérrez-Clellen, 2000; Gutiérrez-Clellen & Peña, 2001; Hasson, et al., 2013; Kramer, Mallett, Schneider, & Hayward, 2009; Miller, Gillam, & Peña, 2001). In a test-teach-test paradigm, two measures are obtained. First, post test scores indicate a student's ability to learn and apply new skills and strategies. Second, measures of student behaviours (obtained during the intervention phase) are highly predictive of language impairment in students (Peña, et al., 2006; Peña, et al., 2007; Ukrainetz, et al., 2000). For example, ratings on just two dimensions of a learning behaviour questionnaire differentiated typically developing from language disordered bilingual students with over 90% accuracy (Peña, et al., 2007).

Consistent with the DIP framework, DA focuses on the ability of the language system to interact with other systems within the individual to produce an effective learning experience. As such it provides SLPs with a more holistic picture of language processing abilities in a functional setting.

#### **7.4.3.3 Looking beyond language**

The case of Peter (chapter 5) highlighted the need to move beyond a description of language competency. A range of assessment techniques identified clear patterns of disorder in L2 but not L1. What these assessments did not identify or specify was a plausible reason for this language profile. Interpretation of Peter's presentation required research across diverse areas of speech and language literature as well as investigation of current models of bilingual language and associated interactions with other cognitive systems.

The assumption that language impairment will always manifest in both languages of a bilingual child was found to be often cited in the literature (e.g., Gutiérrez-Clellen & Simon-Cereijido, 2009; Kohnert, 2010; Kohnert, 2013) but lacking substance. The literature documented significant variability between L1 and L2 in other areas of speech and language research (Aglioti, et al., 1996; Fabbro, 2001; Lim, Lincoln, Chan, & Onslow, 2008; Lorenzen & Murray, 2008; Van Borsel, et al., 2001). The literature also indicated that not all aspects of language are represented in an integrated form in the bilingual brain. As discussed above, L1

and L2 lexicons are stored *separately* (Costa, 2005; Kroll, et al., 2005). For this reason, it is plausible that lexical language disorder could affect just one lexicon within a bilingual speaker.

While the literature confirmed language disorder could affect L2 but not L1, the reason for such a presentation required investigation in a different field of research. In a summary of cognitive functions underlying language disorder, Windsor and Kohnert (2009) suggested that a full understanding of language disorder requires a switch of focus from language performance to a more “bottom up approach of identifying disturbances in basic cognitive functions” (p446). Certainly, consideration of executive functioning theory was helpful in providing a plausible explanation for Peter’s language profile.

Executive function processes (including attention, memory and inhibition) are thought to be critical for modulating competing information between L1 and L2 (Kroll, et al., 2005). These processes are therefore associated with successful acquisition of L2 proficiency.

Consequently, difficulties with executive function are associated with significant variability in speech and language development between L1 and L2 (Fabbro, 2001; Green, 2005; Kroll, et al., 2005; Lim, et al., 2008; Lorenzen & Murray, 2008). In Peter’s case, it is therefore logical that difficulties with lexical selection and inhibition impaired access to and use of his L2 lexicon (English). Strong links to the separately stored L1 lexicon remained intact.

### **7.5 Question 3.**

#### **Can Targeted Intervention Enhance L2 learning for Australian ESB Children?**

##### **7.5.1 Findings**

The third section of this thesis considered ESB language development from an educational perspective. Specifically, chapter 6 examined one option for enhancing L2 development in young ESB children. A nine-week bilingual intervention in the key learning area of mathematics was evaluated. Year one Samoan-English children participated in a study that overlaid their regular classroom mathematics program. One group received all instruction in English. A second group received half of their lessons in English and half in Samoan. The material covered by both groups and the amount of instruction for each group was the same. The only difference was the language of instruction. Pre and post intervention data regarding

conceptual and mathematical knowledge was obtained using two formal assessments: the Boehm Test of Basic Concepts-3 (Boehm) and the Test of Early Mathematics Ability-2 (TEMA). The data showed:

- no significant differences in gains made by the intervention group versus controls on either the Boehm or TEMA (considered in isolation);
- significantly greater improvements for all students on the TEMA in comparison to the Boehm; and,
- differences in each group's profile of learning when considering the Boehm and TEMA together. The intervention group made improvements on both the Boehm and the TEMA. The control group made good improvements on only the TEMA.

### **7.5.2 Interactions Between Language and the Language Learning Context**

Within a DIP framework, language is viewed as a complex and dynamic system “that can be expanded with rich input and diverse opportunities for learning and use” (Kohnert, 2013, p. 179). Even small changes to the system can have a significant impact on learning outcomes. For this reason, evaluation of the language learning context and ways to enhance it in an Australian setting are critical.

#### **7.5.2.1 Immersion versus bilingual education**

ESB children in an Australian context often experience their first regular and consistent exposure to English at school. In general, these children are expected to learn English via immersion. This creates a very different language learning context for monolingual versus ESB children. While monolingual children are relatively competent in the language of education when they start school, ESB children are faced with the dual task of learning the language of education as well as the curriculum. The implicit assumption is that this approach is the only feasible option for producing good L2 learning outcomes at school. This assumption needs critical examination.

Initial research forming the foundation of this thesis suggested that outcomes for ESB children in an Australian language learning context are not ideal (Hemsley, et al., 2006; see Appendix A). After six years of exposure to English at school, the ability of ESB students to understand and use words was found to be significantly below that of their monolingual peers.

The alternative to L2 immersion learning is bilingual learning. Bilingual education, where the school environment uses both L1 and L2, is provided in many parts of the world. In many countries, this approach has been found to produce superior language, literacy and academic outcomes for students (Rolstad, et al., 2005; Slavin & Cheung, 2003). In an Australian context, however, implementation of immersion is challenging. Bilingual programs exist in remote communities where a common indigenous language is shared. In contrast, implementation of bilingual programs in more populated areas, where several cultures and languages can co-exist in a single classroom, are limited (Hones, 2005).

Despite cultural and linguistic diversity, options exist. The intervention study explored one option for extending bilingual teaching in an Australian context. Although intervention occurred for a short period, conceptual learning was greater for students who received their mathematics education in both Samoan and English. Although implementation of bilingual programs in all Australian schools would be difficult, its use in schools with large numbers of ESB children with a common L1 is feasible. As the Australian language learning context is unique, trials ensuring such programs meet the primary goal of enhancing ESB English acquisition would be essential.

### **7.5.3 Interactions Between Systems Within the Learner**

The importance of interactions between the lexical and conceptual systems for language learning was discussed earlier in this thesis. Again in the intervention study, interaction between these systems appeared to influence learning across tasks and interventions.

#### **7.5.3.1 The importance of the conceptual system in word learning**

Differences in learning observed across the two assessments used in the intervention study indicate that some L2 skills are easier for ESB children to learn and apply than others. Vocabulary associated with early mathematic skills (such as counting and addition) appeared to develop more quickly than the vocabulary associated with conceptual knowledge. The relatively slower growth in conceptual development could be due to several factors internal to the learner.

Compared with vocabulary of early mathematics, conceptual vocabulary is less tangible and concrete. The process of learning each term and applying its meaning across contexts may therefore take longer. In an ESB child, conceptual differences between L1 and L2 may further affect this process. As highlighted in chapter 3, sequentially bilingual children look to

their first language when learning a second (Gaskell & Dumay, 2003; Kellerman, 1995; Lindsay & Gaskell, 2010). Words with conceptual distance between L1 and L2 take longer to learn and consolidate in L2. Certainly, many maths concepts have very different lexical representations in English and Samoan. In contrast, the numerical system and basic maths terms are represented similarly across both languages. It is therefore logical that the conceptual distance between languages negatively affected L2 concept acquisition for the Samoan-English ESB children reported in chapter 6. Further research with other language pairs is needed to confirm these findings.

#### **7.5.3.2 The benefit of bridging L1 and L2**

Chapter 6 supported previous studies suggesting that making explicit links between L1 and L2 knowledge can facilitate ESB language learning (Lugo-Neris, Jackson, & Goldstein, 2010; Perozzi & Chavez Sanchez, 1992; Ryan, 2005; Ulanoff & Pucci, 1999). Learning was more balanced in the intervention group: their acquisition of core mathematical skills was matched by the development of underlying conceptual knowledge.

From a dynamic systems perspective, it appears that bilingual instruction facilitated interaction and strong associations between L1, L2, and the conceptual system to produce more elaborate lexical representations, and lexical consolidation of new concepts. An understanding of the mechanisms that facilitate lexical and conceptual acquisition for ESB children would have obvious implications for pedagogical policy relating to this increasing population in Australia. Further research to confirm this finding with larger group sizes is essential.

### **7.6 Lexical Learning Across Studies: A New Construct**

My research with ESB children commenced with a study of year six students (see Appendix A). This study revealed an unexpected result relating to the types of lexical skills ESB children did and did not acquire. As section 1.3.3 outlines, the students in this study were typically developing. School reports and class tests placed students in the average range or above across key learning areas. Despite this, both groups of bilingual children performed significantly below their monolingual peers on lexical tasks. Both their receptive and expressive English lexical abilities lacked the depth and strength of their monolingual peers suggesting incomplete acquisition. This discord between home and school perceptions, academic records and performance on formal language tasks was puzzling.



In light of the overall findings of this thesis and with reference to a DIP framework of language, this result highlights the dynamic nature of lexical learning. It is a process involving time, exposure and interaction between multiple cognitive systems. I propose that the pattern of learning in the year six ESB students reflects two levels of lexical learning: *surface* and *consolidated*.

The year six children ‘survived’ in the classroom with *surface* lexical skills. That is, they were able to learn words in the classroom for specific subjects and academic tasks. This enabled them to experience success in the classroom and in subject specific assessments. Despite this, the data highlighted poor *consolidated* lexical learning: students did not possess strong underlying conceptual links for many words. The importance of these conceptual links has been repeatedly highlighted throughout this thesis. Strong links between the lexicon and conceptual knowledge are vital for generalisation and application of new words in novel contexts (as would be necessary in the unfamiliar formal language tasks used in the year six study).

Why consolidated lexical learning remained poor after six years of L2 exposure requires investigation. It may reflect the type, amount and intensity of exposure to new words in the classroom. In many instances, classes study texts or topics for a few weeks before moving on to something new. This level of exposure would encourage the ‘fast mapping’ phase of word learning. In this phase, a recording of the word is created and stored with available conceptual, syntactic and phonological information. The new word can be used but it remains functionally separate from the established lexicon (Dumay & Gaskell, 2007; Gaskell & Dumay, 2003; Lindsay & Gaskell, 2010). This type of learning would result in less elaborate lexical representations, with fewer links to conceptual knowledge and L1 representations. Further, because education was in L2 only, the nature of instruction would not facilitate interactions between L1 and L2.

A delineation between surface and consolidated learning in ESB children fits well within the DIP framework. It draws together diverse theories and research in bilingual word learning, education and language to consider lexical acquisition as a multi-step process within an educational context. Although ESB children may ‘know’ a word, many factors will be at play before that word will consolidate within the lexicon. These factors include: the type of word/concept represented, type of exposure, amount of exposure across multiple contexts, cross linguistic transfer between L1 and L2, as well as the strength of links to other cognitive

systems. Consideration of these factors was essential in explaining surface versus consolidated lexical learning throughout this thesis.

### **7.6.1 Surface versus consolidated learning in the longitudinal study**

The longitudinal study also supported the construct of surface versus consolidated learning. The data indicated that in the early stages of English acquisition children keep L1 and L2 functionally separate. With time and exposure, consolidated learning occurred: children developed more elaborate lexical representations with stronger links between L1 and L2 and the conceptual system. This was evident in the increase in translation equivalents between languages.

Chapter 3 indicated that consolidated lexical learning is easier for conceptually similar words. If the conceptual characteristics of L1 and L2 representations are congruent, L1 knowledge and resources can be used to facilitate lexical consolidation. Where there is greater conceptual distance between words in L1 and L2, L1 cannot be used to support lexical consolidation in L2 and word learning takes longer. For example, ‘spider’ and ‘apogaleveleve’ have no phonological relationship, however, the conceptual similarity of each word facilitates cross-linguistic interaction and lexical consolidation in L2. Conversely, ‘shorts’ and ‘ofu vae u’umi’ (garment-legs-short) have very different conceptual boundaries between L1 and L2. This conceptual distance was found to inhibit cross-linguistic interaction resulting in slower consolidation within the L2 lexicon.

### **7.6.2 Surface versus consolidated learning in the intervention study**

The intervention study provided further evidence regarding surface versus consolidated word learning. Although the children in this study were young, with limited exposure to English, a similar trend in word learning emerged. Here, as with the year six study, students demonstrated ‘survival’ learning of key mathematical skills taught in the classroom. They obtained surface lexical learning of associated vocabulary and applied this knowledge in familiar tasks (e.g., counting forwards and backwards, adding numbers, identifying ‘more’, etc). These familiar tasks were tested in the mathematics assessment of the intervention study.

Despite their successful application of surface knowledge, the children appeared to have weak consolidated lexical learning. This weakness was demonstrated in the assessment of conceptual development: links to core concepts underlying their mathematical abilities did not improve over time. One explanation for this finding is that students may have fast

mapped new words associated with mathematical tasks but lacked sufficient exposure to develop consolidated lexical learning. Consequently, these students had less elaborate lexical representations, with fewer links to conceptual knowledge and L1 representations.

Students who received bilingual instruction made greater gains in conceptual learning than those who received English-only instruction. This result is consistent with the proposal that L1 knowledge facilitates L2 word learning (Lindsay & Gaskell, 2010). Perhaps the bilingual instruction improved connections between new and existing lexical and conceptual knowledge. That is, bridging L1 and L2 lexical knowledge facilitated links to conceptual knowledge and produced the more elaborate L2 representations associated with consolidated lexical learning. An understanding of mechanisms that facilitate or hinder lexical and conceptual acquisition for this increasing group of Australian children would have obvious benefits for SLPs and educators. Further research into factors assisting word learning in ESB children is vital.

## **7.7 Evaluation of the DIP Framework**

No individual theoretical perspective accounted for the findings of this thesis. The complexities of bilingualism and language in an education context meant that it was necessary to draw on the collective knowledge of several domains of research and professional practice.

Consequently, the findings in this thesis were discussed in relation to a dynamic interactive processing (DIP) framework (Kohnert, 2008, 2013). The DIP framework views language as “a dynamical system that emerges within a social context through interactions of cognitive, neurobiological and environmental systems and subsystems” (Kohnert, 2013, p. 13). The DIP framework is neither a theory nor a model and should not be evaluated as either. As a conceptual framework, it presents “a set of broad ideas and principles taken from relevant research fields that is then used to develop awareness or understanding or to guide activities in a particular area” (Kohnert, 2013, p. 13). The ability of the DIP perspective to successfully meet this brief will now be examined.

### **7.7.1 A Set of Broad Ideas and Principals to Develop Awareness or Understanding**

The DIP framework draws on five parallel and compatible theories. While it could be criticised for its broad frame of reference, it is also refreshing in its flexibility and scope. It

does not require the researcher or clinician to ‘fit’ results within a singular theoretical perspective. On the contrary, this explicit conceptualisation of language enabled consideration of the performance of ESB children in the context of dynamic interactions between L1 and L2, between language and other internal cognitive systems, and between the individual and the language learning environment. This type multifaceted discussion facilitated problem solving, which was essential for unexpected findings.

A prime example of the DIP framework providing a vehicle for original problem solving can be found in chapter 5. In order to obtain a complete picture of Peter’s bilingual language abilities data was collected using a range of techniques drawing on tenets of social constructivism, general interactive processing and dynamic systems theories. The assumption that language disorder must always affect both languages in a bilingual was challenged using the connectionist RHM model (Kroll, et al., 2005). Finally, a plausible reason as to why Peter presented with difficulties in L2 but not L1 was possible by considering tenets of general interactive processing theory: basic cognitive functions essential for effective and efficient language development and use.

Peter’s case emphasises the potential of the DIP framework as a tool to integrate related and parallel theories and models of language. It encourages the researcher or clinician to synthesise information from diverse sources and think ‘outside the box’. Kroll and colleagues support this type of integrative thinking with respect to models of bilingual language (2010). They argue that no one model “provides a fully comprehensive account of bilingual language processing and development. Yet we would argue that none should be left behind; each contributes an important set of insights that provide the foundational constraints for a fully comprehensive model” (Kroll, et al., 2010, p. 378).

### **7.7.2 A Set of Broad Ideas and Principles to Guide Activities in a Particular Area**

As a conceptual framework, the DIP perspective should also be judged for its ability to guide the core business of speech language pathologists: assessment, diagnosis of disorder, and intervention. On the surface, the DIP framework may appear inadequate to achieve this. It does not dictate specific rules or methods for approaching clinical tasks. Rather, the core principles of the DIP framework provide direction and structure for clinical decision making and interpretation of data. In the context of this thesis the DIP framework provided a strong theoretical underpinning for drawing together the theoretical and practical findings associated with assessment and intervention for ESB children.

An example of the DIP framework providing an effective contact point between research and practice can be found in discussion regarding chapters 4 and 5 of this thesis. Reflection on the data drew from a wide range of theories and models consistent within the DIP perspective of language. This required consideration of both the language learning environment as well as interactions within and between the learners' cognitive systems. The result was a series of theory embedded guidelines for assessment with ESB children in an Australian context (see above: 8.4.1–8.4.3).

One of the guidelines outlined in this discussion recommended a shift in language assessment practices from competence-based measures to dynamic assessment of language learning potential. For too long, clinicians have relied heavily on test scores and percentages produced by competence-based assessment measures (Caesar & Kohler, 2007; Schwartz, 2009; Williams & McLeod, 2012). The DIP framework reminds us that these findings are just one part of a bigger picture that includes the language learning context, language learning potential, and interactions between language, cognitive and neurobiological systems. Consideration of the research behind this recommendation provides a convincing argument for change. This type of translation between theory and practice has the potential to drive change in speech pathology practice.

### **7.7.3 Potential for Further Use**

The DIP framework has yet to be widely used and evaluated in the literature. This may be because it lacks specificity. For example, while the framework emphasises the importance of the language learning context on language acquisition, it does not elaborate on or discuss which aspects of the environment may be more influential than others. Similarly, although cognitive systems are viewed as essential for language development, neither a means for conceptualising these interactions nor their possible weightings has been addressed. Effective use of the DIP framework therefore requires an understanding of all five theories on which it draws. It has no explanatory power in itself without reference to the tenets of these theories.

Nevertheless, the DIP framework provides a unifying conceptualisation of language that fosters creative thinking across a range of language domains. In the context of this thesis, it was therefore a valuable tool for exploring the research findings in a clinically relevant way. Viewing language development as the product of interaction between several dynamic systems within and outside the learner provided a cohesive picture of typical language

development, direction for differentiation of language difference from disorder, and a clear construct for supporting ESB language development in an educational setting.

## **7.8 Conclusion**

This thesis presents a snapshot of ESB lexical development in Australia. Importantly, it provides SLPs with a starting point for considering typical and atypical language development in a clinical setting. ESB children do eventually acquire native proficiency in L2, but the timeline, sequence and manner of their development in L2 differs from that of their monolingual peers. They are, indeed, language different. Further research in this important field is vital. Investigation in Australia and other nations is vital for a more complete comprehension of the patterns of similarity and difference across cultures, language pairs, and language learning contexts.

# References for Chapters 1 and 7

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# Appendix 1

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Hemsley, G., Holm, A. & Dodd, B. (2006). Diverse but not different: the lexical skills of two primary age bilingual groups in comparison to monolingual peers. *International Journal of Bilingualism*, 10(4), 453-476.

# Diverse but not different: The lexical skills of two primary age bilingual groups in comparison to monolingual peers

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## Abstract

Most investigations of bilingual language development focus on children acquiring two European languages. Little research has investigated diverse language pairs or compared the influence of the first language on second language development. The study reported here compared the lexical skills of three groups of 11-year-old students from different language backgrounds. Two bilingual groups (first language Vietnamese or Samoan, second language English) and a monolingual control group matched for social class were compared on a series of tasks. The tasks examined English lexical comprehension and use, as well as single word processing on nonword tasks. The results showed that both bilingual groups performed significantly below their monolingual peers in all lexical tasks but not on nonword tasks. There were no differences between the two bilingual groups, despite the fact that the cultural and linguistic backgrounds of each were very different. The findings indicate that despite six years of formal schooling in English, including focused ESL support, bilingual students from both Vietnamese and Samoan cultural backgrounds perform less well than their peers in their understanding and use of the English lexicon. The implications of these findings for theory of bilingual language acquisition, assessment practice and educational policy are considered.

## Key words

*bilingual lexical  
development*

*Samoan*

*Vietnamese*

## 1 Introduction

A great deal of research has examined the acquisition of language by bilingual children. Although different bilingual acquisition contexts have been reported, many studies have focused on children from middle class backgrounds learning English in addition to a European language simultaneously (David & Li Wei, in press; De Houwer, 1995; Genesee, 1988). Language development of individuals or small groups is usually considered over time and rarely in comparison to monolingual speakers of the “target” second

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language (David & Li Wei, 2007). There is also evidence that the pattern of language acquisition is affected by the specific language pairs being acquired (Genesee, 1988) and the learning context of populations studied (Zhu & Dodd, 2006). Consequently, it is difficult to generalize findings across different language pairs and different language learning contexts. This paper compares the lexical abilities of two culturally diverse groups of 10–11-year-old students, who had either Samoan or Vietnamese as a first language, and English as a second language, acquired at school. One of the primary aims of the study was to determine whether these students demonstrated comparable lexical knowledge and use to monolingual peers. As such, the results of each bilingual group are compared to a monolingual control group matched for chronological age and socioeconomic status.

In this paper, bilingualism refers to the ability to understand and/or use two languages (Brutt-Griffler & Varghese, 2004). Although several types of bilingualism have been identified in the literature, the simplest dichotomy refers to simultaneous and sequential bilingualism. The former describes acquisition of two languages from birth while the latter refers to acquisition of at least minimal competence in one language (L1) before introduction of the second (L2). Early sequential bilingualism describes introduction of the second language during the first five years of life, or “primary language development” period (Genesee, 1988; Kohnert & Bates, 2002). In late sequential bilingualism, the second language is introduced in later childhood or adulthood.

The impact of the age when L2 is introduced and the amount of exposure to each language on bilingual language acquisition is controversial. Some evidence suggests that early sequential bilinguals develop higher levels of second language proficiency than those who acquire L2 after the primary language development period (Genesee, 1987; Schachter, 1986). Other authors argue that proficient second language acquisition is possible for all students introduced to L2 before puberty, “as long as cognitive development in the first language continues up through age 12 (the age by which first language acquisition is largely completed)” (Collier, 1989, p. 511).

This confusion raises pedagogical questions regarding best practice in supporting L2 development at school, without hindering academic progress. Cummins (1981, 1984, 1991, 2000) has written extensively on this issue, suggesting a fundamental distinction between conversational and academic proficiency, also referred to as basic interpersonal communicative skills (BICS) and cognitive academic language proficiency (CALP). Cummins (1981, 1984) reports that while bilingual students can attain conversational skills commensurate with monolingual peers after approximately two years of exposure to L2, a considerably longer period of time (an average of 5–7 years) is required to learn sufficient English to perform at the same level in academic tasks. Similar findings are also reported by Hakuta, Butler, & Witt (2000) and Ramírez (1992).

Although the concept of academic proficiency is frequently referenced in the literature, there remains no definitive explanation regarding the specific language skills able to produce academic success (Valdéz, 2004). As a concept however, there is little doubt that a certain level of language proficiency is required for bilingual students to follow and participate in the events and instruction of the classroom. Portmann-Tselikas (2000) proposed that if academic proficiency “is not developed to an adequate degree, content learning is hampered. At the same time, and as important, the massive linguistic



input school provides can only insufficiently be used for language learning” (p. 73). Subsequently, bilingual students may find it difficult to relate to language and literature as a meaningful tool for obtaining and sharing knowledge, widening the gap between them and monolingual peers. The current study will specifically examine this divide between monolingual and bilingual peers.

The concept of academic proficiency assumes that bilingual students have reached a level of L2 proficiency comparable to that of monolinguals. A review of the literature, however, revealed just one study comparing the language skills of monolingual and bilingual students (with several years of exposure to L2). Windsor and Kohnert (2004) compared 8–13-year-old monolingual and bilingual students (Spanish and English speaking) identified as having normal language development. In an auditory lexical decision task, both groups were able to identify real word stimuli, although bilinguals had more difficulty rejecting nonsense stimuli. Bilingual students were also less accurate and slower in naming common pictures in English than the monolingual group. Windsor and Kohnert (2004) suggested these patterns might reflect “less elaborate lexical representations in English as a consequence of less experience in the language” (p. 889).

A significant amount of research has focused on student development of L2 over time. Some studies have evaluated L2 academic proficiency by seeking better performance, or language dominance, in L2 over L1, particularly in lexical development. A person is considered dominant in a language when skills are superior to another language, regardless of order of acquisition, or length of exposure. Kohnert and Bates (2002) note that language dominance occurs when skill level is not comparable across the two languages.

Magiste (1992) evaluated language balance and dominance in bilingual elementary and secondary school students where L1 was German and L2 was Swedish. As length of residence in Sweden increased (and hence exposure to the Swedish language), response time and accuracy scores on a picture naming task became “language balanced,” or similar in both languages. For elementary students this occurred after approximately four years of exposure to L2. Further schooling in Sweden resulted in L2 becoming the ‘dominant’, or better language with regards to lexical efficiency.

Kohnert and Bates (2002) also evaluated language dominance among early sequential bilinguals with an L1 of Spanish, and English being introduced at school. This study expanded the concept by contrasting lexical comprehension and production. Comprehension data was obtained using a picture word verification task, while a picture naming task measured production. Comparison revealed that performance was better in English (L2) than Spanish by middle childhood. Of interest, the transition to English dominance occurred earlier in comprehension, with English emerging as the stronger language in 11–13-year-olds with an average of 6.9 years of formal English experience. “The shift to greater strength in L2 for production was not evident until 14–16 years of age, after approximately 10 years of systematic English experience” (Kohnert & Bates, 2002, p. 354). This research study is of particular relevance to the current study, where comprehension and production were both examined. Based on this information, it could be predicted that relative skill in L2 would vary as a function of testing modality (comprehension or production).

The literature leaves little doubt that L2 acquisition is a lengthy process for students who speak one language at home, and are introduced to another at school (early sequential bilinguals). These children find themselves engaged in the complex process of learning a language to interact with others, but also to understand and master curriculum outcomes. Windsor and Kohnert (2004) conclude that this population “face some of the same academic and social challenges as do monolingual children with language impairment” (p. 878). Although language processing may be intact, performance on language tasks can be affected due to different language experiences, fewer language opportunities as well as distribution of linguistic knowledge and exposure across two languages.

It is therefore not surprising that bilingual students can be misrepresented with regards to language and learning support (Winter, 2001). Both false positives (over-referral of children who are subsequently found to have normal language and learning) and false negatives (under-referral of children with language and/or learning needs) are reported (Crutchley, Botting, & Conti-Ramsden, 1997; Hall, Griffiths, Haslam, & Wilkin, 2001).

Over-referral of bilingual children can result in misidentification of language or learning difficulties (Bos & Reyes, 1996; Donovan & Cross, 2002; Fueya, 1997). Although educators understand that it takes some time for students to develop sufficient language levels to understand and participate in the school curriculum, the point at which it is no longer acceptable for students to be behind their monolingual peers is difficult to determine.

Under-referral of bilingual students to speech language therapy (Stow & Dodd, 2005; Winter, 1999) and special education services (Donovan & Cross, 2002; Hwa-Froelich & Westby, 2003), is reported particularly in the early years of schooling. Crutchley et al. (1997) suggest that lower primary bilingual children require more severe language difficulties than monolingual children to be either identified as having specific language impairment or referred to a language unit. Similarly, “both early childhood educators and elementary teachers working with Southeast Asian children have reported that few Asian children are referred for special education services until fifth or sixth grade because of the difficulty in determining whether learning problems are due to learning ESL or to more general language-learning problems” (Hwa-Froelich & Matsuo, 2005, p. 231).

Clearly, there is a need to understand the nature of second language learning and its normal variations compared to monolingual development. Without this, educators will continue to experience difficulty identifying students whose language development is impaired, in turn affecting the timing and type of intervention provided (Nicoladis & Genesee, 1997).

This study aims to fill gaps in our knowledge relating to the language development of early sequential bilinguals at an age where “academic proficiency” and L2 dominance are theoretically in place. It varies from much of the research presented above, comparing bilinguals to their monolingual peers, the group with whom they will compete for academic placement in years to come.

Comparison of bilingual groups on English language tasks will provide information regarding the similarities and differences of L2 acquisition for different language groups. Information obtained covers two dimensions. The first follows previous studies (Kan & Kohnert, 2005; Kohnert & Bates, 2002) in comparing receptive and expressive lexical abilities, or put more simply, comprehension versus use of words across a range of tasks.

A second, more novel lexical analysis will also be used. This will compare representation (or storage) of words in the lexicon semantically (meaning) and phonologically (sound structure). According to Chiat's (2000) linguistic framework, lexical representations of words are stored in both these formats. While measures have been developed to examine this dimension of the lexicon (e.g., Howard & Franklin, 1988; Morris, 1997) no study to date has applied it to bilingual populations.

This study also differs from recent literature in that it shifts focus from European languages to two very different languages: Vietnamese and Samoan. Linguistically, these populations are highly diverse. Although Vietnamese is part of the Austroasiatic language family, much vocabulary has been borrowed from Chinese. Vietnamese is a monosyllabic and tonal language, with alterations in syllable pitch (high, low or mid) and contour (rising or falling) creating changes in word meaning (Comrie, Matthews & Polinsky, 1996; Nhan, 1984). While English has a syllable structure of (C1–3)V(C1–4), Vietnamese syllable structure can be summarized as (C1–2)V(C1). The incidence of word initial consonant clusters and final consonants are very low, however there are many vowel diphthongs and triphthongs (Nhan, 1983; Nhat, 1977). Although there are 18 consonants in the Vietnamese language, there is limited overlap of sounds between English and Vietnamese (Hwa-Froelich, Hodson, & Edwards, 2002). Like English, Vietnamese has SVO word order (e.g., dogs drink water) (Comrie, Matthews, & Polinsky, 1996).

Samoan is from the Austronesian family of languages. It has a core of 10 consonants, although some consonants are only used in the formal register of speaking. Samoan allows only open syllables, meaning that while a syllable may begin with a consonant it may not end with one (Comrie, Matthews, & Polinsky, 1996; Pratt, 1862). Consonant clusters do not occur in Samoan. Syllable structure can therefore be summarized as (C<sub>i</sub>)V. Like many Polynesian languages, reduplication (full or partial word repetition) is commonly used to mark grammar including plurals, superlatives or intensity, for example, *mu* 'to burn'; *mumū* 'to burn brightly' (Pratt, 1862). Structurally, Samoan sentences commence with a verb, with the basic structure being VSO (e.g., 'drink dogs water') or VOS (e.g., drink water dogs) (Comrie, Matthews, & Polinsky, 1996).

The current study focuses on children from lower socioeconomic status (SES) backgrounds. Most studies report on the abilities of middle class students or do not mention the SES background of their students adding to difficulties in generalizing findings. Many bilingual children, however, are recent immigrants who tend to live in lower SES areas within large cities (McCaffery, Tuafuti, Maihi, Elia, Ioapo, & Aukuso 2003; Schlesinger, 1992). The children whose abilities are reported in this paper live in the same low SES geographical area. While there is a link between low SES and language delay (Locke, Ginsborg, & Peers, 2002; Whitehurst, 1997; Whitehurst & Fischel, 2000), by drawing all participants from the same SES and including monolingual controls, the findings should discriminate between difficulties attributable to SES versus the effects of acquiring English as a second language.

## 2 Goals of the study

The present work aims to evaluate the acquisition of English lexical ability in Year 6 students from Vietnamese and Samoan backgrounds, whose main exposure to English

commenced with formal schooling in Australia. Skills on several lexical tasks were measured and compared to age matched monolingual students. Specifically, the study aimed to determine whether:

- Year 6 students (age 10–11), bilingual in Vietnamese-English or Samoan-English have English lexical comprehension and production comparable to monolingual peers.
- Year 6 students, bilingual in Vietnamese-English or Samoan-English have English lexical comprehension and production comparable to each other.
- Year 6 monolingual and bilingual students make the same proportion of semantic and phonological errors during English lexical tasks.
- Year 6 monolingual and bilingual students complete nonword tasks differently (i.e., lexical decision, auditory discrimination and nonword repetition).

## 3 Method

### 3.1

#### ***Background to bilingualism in the area studied***

Australia is a country of cultural and linguistic diversity. Although English is the language of education, major cities have high proportions of immigrant populations, and subsequently, students learning English as a second language (ESL) at school. Cultures represented are many and diverse, with 44 immigrant language groups represented (Gordon, 2005). This is perhaps why limited research has been completed to date within the bilingual population. This study was completed in a capital city, in an area where the majority of bilingual students, as reported by the schools in the study, ranged from 42–58%. Although small numbers are from south east Asia, Indian, or European backgrounds, the majority of bilingual students are of Vietnamese or Pacific Island heritage.

The migration of these populations to Australia has occurred for different reasons. Prior, to 1975, there were very few Vietnamese people in Australia. In the decade following the end of the Vietnam War however, thousands of refugees were offered permanent residence in Australia on humanitarian grounds. Since this time, steady migration has continued to allow family reunification, education or employment opportunities (Museum Victoria, 2005). In contrast, Samoans have gradually migrated to Australia to pursue education and employment opportunities since the late 1970s (Museum Victoria, 2005).

Within the area studied, students are provided with three years of support from a specialist ESL teacher from the time they begin formal schooling at five years of age (Year One). While all students receive 1–2 hours of tuition each week, the content and delivery varies between schools. ESL teachers work with whole classes, small groups or individuals according to the English-language experience of participants.

### 3.2

#### ***Participants***

Socioeconomic status was the first factor considered when selecting groups, as families with higher SES are known to provide children with more experiences and linguistic habits that foster academic proficiency (Locke et al., 2002; Portmann-Tselikas, 2000; Whitehurst, 1997; Whithurst & Fischel, 2000). In the current study, this factor was

**Table 1**  
Subject Details

	Group Size	No. Males	No. Females	Mean age (SD)
L1E	30	17	14	134.8 months (3.79)
L1V	34	20	15	134.7 months (4.94)
L1S	28	20	12	135.4 months (3.71)

controlled by assessing students from schools within a single geographic area of a capital city in Australia. Information regarding its socioeconomic status was obtained from Census data (Australian Bureau of Statistics, 2001). The index of relative socioeconomic advantage, which considers income, education, qualifications, and occupation, placed the suburb in the bottom 10% of the population.

101 students were recruited from six schools. Students eligible for participation were identified by Year Six teachers at each school. Students were eligible if Samoan or Vietnamese was learned as a first or primary language in the home. All students were in their sixth year of full time education in English speaking schools (early sequential bilinguals). The literature suggests that this level of English exposure is sufficient for students to develop L2 proficiency enabling valid participation in English language tasks (Collier, 1987; Cummins, 1984; Hakuta et al, 2000; Kohnert, Bates, & Hernandez, 1999; Kohnert & Bates, 2002; Ramírez, 1992; Windsor & Kohnert, 2004). Information regarding home language use was confirmed through an interview with each student prior to assessment. This also enabled the assessor to verify that each student had completed six years of formal education in an English speaking school. All bilingual students reported that L1 continued to be the primary language spoken with parents at home, although many noted that conversations with siblings and bilingual friends were spoken in a mix of L1 and L2. No students with diagnosed disabilities, according to school records, were included in the study (intellectual impairment, hearing impairment, autistic spectrum disorder, etc.).

Once the Vietnamese (L1V) and Samoan Groups (L1S) groups were established, an English monolingual comparison group (L1E) was also selected. Half the bilingual students at each school were selected at random. Teachers then matched a monolingual student to each student on the list (i.e., of same gender and performing at a similar level academically). This meant that there were approximately equal numbers in each group, with monolingual matched pairs to half the L1V and half the L1S groups.

Before completing the experimental tasks, nonverbal intelligence was screened using the Block Design subtest of the Wechsler Intelligence Scale for Children—fourth edition (Wechsler, 2003). This ensured that results would not be influenced by students with global cognitive difficulties. Nine students were identified as being outside the average range on this task (standard scores below 7) and were excluded from the study. This left 92 students in the experimental group, with a mean Block Design standard score of 11.17 ( $SD = 2.12$ ; range = 7–17).

The final groups were of comparable size with 30 monolingual English students (L1E), 34 Vietnamese-English speaking students (L1V) and 28 Samoan-English speaking

students (LIS). A total of 57 male and 41 female Year 6 students were assessed, with a mean age of 134.98 months ( $SD = 4.18$  months). All groups were well matched for age,  $F_{(2, 91)} = 0.441$ ,  $p = .662$ . Table 1 outlines these details for each group.

### 3.3

#### **Procedure**

Each student was tested at their school in a quiet room during school hours over 1–2 sessions. Total individual assessment time was approximately 40 mins. Tasks were administered in a set order, as outlined in Appendix 1.

All tests were administered by a single English speaking Speech Pathologist. Consistency and integrity of experimental tasks was ensured by administering each test using set instructions and sufficient practice items to ensure task comprehension. Labeling tasks were tape-recorded so that accurate transcription of responses could be achieved, without lengthening the assessment session.

### 3.4

#### **Experimental tasks**

*Measures of lexical development:*

1. A receptive picture name judgment task was developed for the study to examine processing and integrity of semantic and phonological representations in English. Students were presented with color drawings, 4.5cm square. Each picture was named by the examiner, following which the student said “yes” or “no” to indicate whether the given label was correct. The 60 items were 1–4 syllables in length, and included 20 accurate labels. These, as well as 20 semantic foils were selected from a picture verification test developed by Morris (1997). Semantic foils offered a semantically similar label for a picture (e.g., ‘sleeve’ for collar). Twenty phonological foils were words altered by a single, word medial or final consonant, with balanced changes to voicing (e.g., ‘dize’ for dice), place (e.g., ‘tider’ for tiger) and manner (‘pyrabid’ for pyramid) of articulation. Word length was also controlled. Phonological foils were selected from an extensive list developed by Howard and Franklin (1988). All test items are listed in Appendix 1. This test provided a total score out of 60, as well as accuracy scores for identifying phonological and semantic errors.
2. The Hundred Pictures Naming test (Fisher & Glenister, 1992) provided a measure of lexical knowledge and efficiency. Students were required to label 100 line drawings as quickly as possible. An accuracy score as well as the time taken to complete this task were recorded. Although not all items were of equal difficulty, most were common objects that would be considered essential vocabulary in the classroom (Rescorla, 1989; Snodgrass & Vanderwart, 1980). By testing everyday vocabulary, it was felt this task enabled lexical efficiency to be more reliably measured in the bilingual group.
3. The Expressive Vocabulary subtest of the Clinical Evaluation of Language Fundamentals: 4<sup>th</sup> edition (CELF-4) (Semel, Wiig, & Secord, 2003) required students

to label 27 illustrations of people, objects and actions without time pressure. This task was selected for its inclusion of several less common items across a range of semantic categories, including several polysyllabic words, such as binoculars, octagon and saxophone. Although this is a standardized task in the CELF-4, students in this study were outside the normed age range. As such a total score was calculated.

4. The Word Classes subtest of the CELF-4 provided information regarding comprehension and explanation of lexical associations. It contained two components. The receptive component required students to listen to four words, then select two words that belonged together (e.g., pillow, door, blanket, lamp). In the expressive component, students then explained the relationship between selected words (e.g., a pillow and blanket both belong on a bed). This task was administered using standardized instructions, as well as basal and ceiling rules, in order to obtain receptive and expressive standard scores. The mean standard score was 10, with a *SD* of 1.5.

*Measures of auditory processing of non-words:*

Difficulties in the phonological component of the Receptive Picture Name Judgment task could be attributed to difficulties perceiving relevant features of the speech signal (Chiat, 2000). Therefore, to ensure that any language differences between groups could not be attributed to perceptual differences beyond lexical storage, some nonword tasks were included in the test battery.

1. An auditory lexical decision task measured student awareness of word authenticity, requiring them to compare a spoken word to stored phonological representations in their lexicon. Students pointed to a picture of a girl or an alien to show whether 40 words presented by the examiner were real or nonsense. Each of 20 real words in the task was matched with a similar sounding, phonetically plausible nonsense word (e.g., 'sister' and 'drister'). A balance of high versus low frequency and high versus low imageability words were selected from the extensive list in the Auditory Lexical Decision task of the Psycholinguistic Assessments of Language Processing in Aphasia (Kay, Lesser, & Coltheart, 1992).
2. An auditory discrimination of nonwords task was developed based on Dollaghan and Campbell's nonword repetition stimuli (1998). This provided information regarding student skills in discrimination of small differences in auditory information, without accessing the lexicon. Students listened to two nonwords of 1–4 syllables in length (presented orally) and identified whether they were the same or different. Differences in the 32 items were created by changing a feature of the final sound, or by transposing two sounds in a word. Task items are listed in Appendix 3.
3. In a nonword repetition task, students repeated 16 nonwords between one and four syllables in length. The word list was developed by Dollaghan and Campbell (1998) and evaluated ability to discriminate and repeat sound sequences.

### 3.5

#### **Analyses**

Parametric statistics (primarily repeated measures analyses of variance) compared the three groups' performance across tasks. Qualitative evaluation of data compared error pattern profiles. A  $p < .05$  level of significance for 2-tailed tests was set as the critical level.

## 4 Results

Table 2 shows all means and *SDs* for each group for all tasks. The Results section first reports performance on individual lexical tasks and then investigates relationships between tasks. All analyses were completed using the SPSS version 13.

**Table 2**

Summary of Results

	L1E	L1V	L1S
	Mean (SD)	Mean (SD)	Mean (SD)
<b>Lexical Tasks</b>			
Receptive Picture Name Judgment Task total score	51.7 (4.3)	46.5 (4.3)	46.6 (5.4)
Hundred Pictures Naming Test total score	95.2 (3.0)	88.1 (6.9)	88.2 (5.0)
HPNT time (seconds)	160.6 (32.0)	186.9 (44.1)	180.9 (44.7)
Expressive Vocabulary raw score	43.8 (5.2)	36.3 (7.2)	34.0 (7.7)
Word Classes: receptive standard score	9.0 (2.1)	7.5 (1.9)	7.2 (2.5)
Word Classes: expressive standard score	8.5 (1.8)	6.9 (1.7)	6.1 (2.0)
<b>Non-Word Tasks</b>			
Auditory Lexical Decision raw score	38.9 (1.1)	37.9 (1.9)	37.0 (5.5)
Auditory Discrimination of Non-Words raw score	31.4 (0.9)	31.4 (0.8)	31.6 (0.6)
Non-Word Repetition raw score	14.4 (2.0)	13.8 (1.5)	13.2 (1.8)

### 4.1

#### **Lexical development**

##### *Receptive picture name judgment*

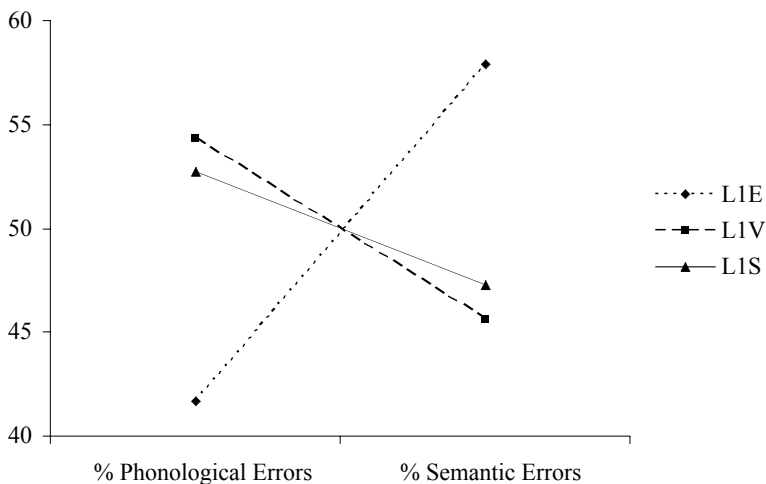
A repeated measures ANOVA compared semantic and phonological errors made by the three groups on this task. The groups term was not significant,  $F_{(2, 89)} = 0.93$ ,  $p = .40$ , indicating that the three groups made equal number of errors overall. The number



of semantic and phonological errors was also equal, as indicated by the tasks term,  $F_{(1, 89)} = 0.46, p = .83$ . However, the interaction term was significant,  $F_{(2, 89)} = 5.85, p < .01$ . To investigate the interaction between phonological and semantic errors, one-way ANOVAs with Bonferroni post hoc tests were done. These indicated that the monolingual English speaking group (L1E) had a greater proportion of semantic errors,  $F_{(2, 91)} = 5.72, p < .01$ , than the Vietnamese speaking (L1V) and Samoan speaking (L1S) groups, both of whom had a greater proportion of phonological errors,  $F_{(2, 91)} = 5.97, p < .01$ . Within-group comparison of semantic and phonological errors, using paired  $t$ -tests, indicated that two groups had significant differences between the proportion of semantic and phonological errors (L1E:  $t_{(29)} = 2.06, p < .05$ ; L1V:  $t_{(33)} = 2.29, p < .05$ ). In contrast, the L1S did not differ in the proportion of error types made,  $t_{(27)} = 1.2, p = .24$ . The interaction is illustrated in Figure 1.

**Figure 1**

Interaction of error types in the receptive picture name judgment task



Further investigation of the phonological errors made by each of the groups was completed using a repeated measures ANOVA. The measures used evaluated student discrimination of manner, place and voice of speech sounds in words. Raw scores were transformed into percentage scores because there were different numbers of trials assessing manner, voice and place discriminations. As indicated by the significant interaction term in the previous analysis, the groups' term was significant,  $F_{(2, 89)} = 10.69, p < .001$ . Post hoc Bonferroni multiple comparisons showed that while the bilingual groups did not differ, the monolingual group made fewer phonological errors than the Samoan group (mean difference = 17.79,  $p < .001$ ) and the Vietnamese students (mean difference = 13.51,  $p < .01$ ). The condition's term was also significant,  $F_{(2, 178)} = 50.2, p < .001$ , indicating that the proportion of errors made was affected by type of discrimination required (see Fig. 2). The interaction term was significant,  $F_{(4, 178)} = 7.44, p < .001$ , indicating that the groups' profile across error types differed. Post hoc independent  $t$ -tests demonstrated that the groups did not differ significantly on manner discrimination (L1E vs. L1S

$t_{62}=0.62$ ; L1E vs. L1V:  $t_{62}=0.50$ ; L1V vs. L1S  $t_{62}=0.08$ ). However, the monolingual group made fewer place discrimination errors than the bilingual groups (L1E vs. L1S  $t_{62}=2.34, p<.05$ ; L1E vs. L1V:  $t_{62}=4.48 p<.001$ ; L1V vs. L1S  $t_{62}=1.80$  NS). Similarly, for the voice discriminations the monolingual group made fewer errors than the Samoan and Vietnamese groups, who did not differ (L1E vs. L1S  $t_{62}=3.93, p<.001$ ; L1E vs. L1V:  $t_{62}=4.48 p<.001$ ; L1V vs. L1S  $t_{62}=0.50$  NS).

**Figure 2**

Phonological error types in the receptive picture name judgment task:  
Discrimination of manner, place and voicing of speech sounds in words

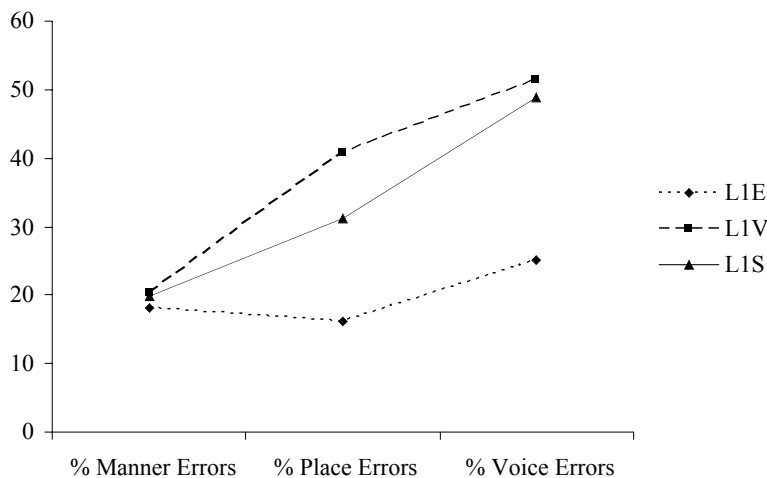


Table 3 shows how performance on the picture-name judgment task was affected by number of syllables in words being discriminated. Because many students made no errors on one syllable words, the comparison of the proportional data used nonparametric statistics (Wilcoxon Signed Ranks). As can be seen from the pattern of means, the monolingual group made fewer phonological errors. The groups made fewer errors on mono-syllabic words than on bisyllabic words ( $Z=6.29, p<.001$ ) and multisyllabic words ( $Z=5.89, p<.001$ ). However, there was no difference between the number of bisyllabic and multisyllabic word errors ( $Z=1.09$ , NS).

**Table 3**

Affect of syllable length on picture name judgment performance: Mean percent errors (SD)

	Monosyllabic words	Bi-syllabic words	Multi-syllabic words
L1E	11.1 (19.2)	23.7 (21.0)	22.0 (23.1)
L1V	23.0 (18.4)	40.8 (14.1)	45.9 (20.6)
L1S	17.9 (20.2)	37.7 (19.2)	40.7 (29.1)

*Hundred Picture Naming test*

Two measures were obtained: accuracy score and a measure of time to complete the task. Two one-way ANOVAs compared the groups' performance. There was a significant difference in performance on accuracy scores,  $F_{(2, 91)} = 18.04$ ,  $p < .001$ , with post hoc Bonferroni tests indicating the L1E performed better than both bilingual groups (L1V: mean difference = 7.17,  $p < .001$ ; L1S: mean difference 7.02,  $p < .001$ ). While the time score was also significant,  $F_{(2, 91)} = 3.56$ ,  $p < .05$ , the only difference was that the L1E group were faster than L1V (mean difference = 26.32,  $p < .05$ ). There was no significant difference between time score for the L1E and L1S groups (mean difference = 20.36,  $p = .18$ ).

Pearson correlations were conducted for each group to describe the relationship between time and accuracy. There was no positive correlation for L1E ( $r = -0.03$ ,  $p = .89$ ), or L1S ( $r = -0.29$ ,  $p = .133$ ), however the L1V group showed a significant negative correlation ( $r = -0.56$ ,  $p = .001$ ), indicating that better results were associated with longer response times.

*Expressive vocabulary (CELF-4)*

A one-way-ANOVA comparing the total score of the three groups on this task was significant,  $F_{(2, 91)} = 16.87$ ,  $p < .001$ . Post hoc Bonferroni corrected tests indicated that L1E performed better than L1V (mean difference = 7.54,  $p < .001$ ) and L1S (mean difference = 9.80,  $p < .001$ ). There no difference between the two bilingual groups.

*Word Classes (CELF-4)*

A one-way-ANOVA comparing standard scores on the receptive component of this task between groups was significant,  $F_{(2, 91)} = 5.79$ ,  $p < .01$ . Post hoc Bonferroni corrected tests indicated that L1E performed better than L1V (mean difference = 1.47,  $p < .05$ ) and L1S (mean difference = 1.79,  $p < .05$ ). There no difference between the two bilingual groups.

Another one-way-ANOVA comparing standard scores on the expressive component of the Word Classes task was also significant,  $F_{(2, 91)} = 13.71$ ,  $p < .001$ . Post hoc Bonferroni corrected tests indicated that L1E performed better than L1V (mean difference = 1.62,  $p < .005$ ) and L1S (mean difference = 2.46,  $p < .001$ ). There no difference between the two bilingual groups.

**4.2*****Receptive versus Expressive Measures****Receptive Picture Name Judgment versus Expressive Vocabulary*

A repeated measures ANOVA investigated the groups' performance on percent accuracy scores for the expressive vocabulary subtest of the CELF-4 and the receptive picture name judgment task. The results showed a significant groups term,  $F_{(2, 89)} = 19.646$ ,  $p < .001$ . Post hoc Bonferroni-corrected tests showed that while the two bilingual groups did not differ, the monolingual group performed significantly better than L1V (Mean difference = 2.22,  $p < .001$ ) and L1S (Mean difference = 2.33,  $p < .001$ ). The groups performed better on the receptive picture-name judgment task than on the expressive vocabulary task,  $F_{(1, 89)} = 73.04$ ,  $p < .001$ . The interaction term was also significant,  $F_{(2, 89)} = 5.45$ ,  $p < .01$ . Post hoc paired  $t$ -tests showed that all three groups performed better on the receptive picture-name judgment task (L1E:  $t_{(29)} = 2.69$ ,  $p < .025$ ; L1V:  $t_{(33)} = 6.02$ ,  $p < .001$ ;

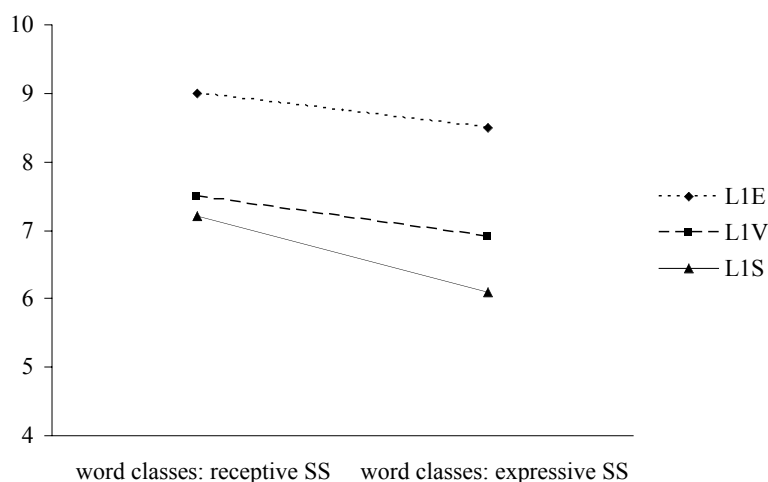
L1S:  $t_{(27)} = 5.81, p < .001$ ). In order to determine the cause of the interaction, difference scores (picture-name judgment-expressive vocabulary) were calculated for all children. A one-way ANOVA indicated that the groups differed,  $F_{(2, 91)} = 5.45, p < .01$ , with Bonferroni-corrected post hoc tests demonstrating that the interaction was due to the difference between the two tasks being greater for the Samoan-speaking children than for the monolinguals (mean difference = 9.66,  $p < .01$ ).

#### *Receptive Word Classes versus Expressive Word Classes*

The above differences in comprehension and production may have been attributable to task difficulty. For this reason a further comparison examined receptive versus expressive standard scores on the Word Classes task. A repeated measures ANOVA investigated standard scores for the three groups receptive and expressive performance. Results showed a significant groups term,  $F_{(2, 89)} = 10.76, p < .001$ . Post hoc Bonferroni-corrected tests showed that while the two bilingual groups did not differ, the monolingual group performed significantly better than both L1V students (mean difference = 1.54,  $p < .01$ ) and L1S students (mean difference = 2.13,  $p < .001$ ). The groups performed better on the receptive element of the task than on the expressive component,  $F_{(1, 89)} = 23.01, p < .001$ . The interaction term was not significant,  $F_{(2, 89)} = 1.28, p = .283$ . Figure 3 illustrates the three groups' performance on the receptive and expressive tasks.

**Figure 3**

Group differences in the Word Classes task



### **4.3**

#### **Word Processing tasks**

##### *Auditory lexical decision*

A one-way-ANOVA comparing group performance on this task was not significant,  $F_{(2, 91)} = 2.56, p = .083$ .

*Auditory discrimination of nonwords*

A one-way-ANOVA comparing group performance on this task was not significant,  $F_{(2, 91)} = 1.15$   $p = .32$ .

*Nonword repetition*

A one-way-ANOVA comparing the groups performance on this task was significant,  $F_{(2, 91)} = 3.46$ ,  $p < .05$ . Post hoc Bonferroni corrected tests indicated that the only difference was between L1E students who performed better L1S students (mean difference = 1.22,  $p < .05$ ). There were no difference between the two bilingual groups, or between L1E and L1V.

## 5 Discussion

This study compared the lexical skills of three groups of 11-year old students from different language backgrounds. Two bilingual groups (first language Vietnamese or Samoan, second language English) and a monolingual control group matched for social class were compared on a series of tasks. The tasks examined English lexical comprehension and use, as well as single word processing on nonword tasks. The results showed that both bilingual groups performed significantly below their monolingual peers in all lexical tasks but not on nonword tasks. There were no differences between the two bilingual groups, despite the fact that the cultural and linguistic backgrounds of each were very different. The findings indicate that despite six years of formal schooling in English, including focused ESL support during Years 1–3, bilingual students from both Vietnamese and Samoan cultural backgrounds perform less well than their peers in their understanding and use of the English lexicon.

### 5.1

#### **Receptive Picture Name Judgment**

Total scores indicated that each group had a comparable number of errors overall on this task. The tasks term indicated that the number of overall semantic and phonological errors was also equal. The number of semantic errors for all groups was similar, suggesting reduced exposure and experience with low frequency words such as ‘bridle’, ‘sleeve’ and ‘bagpipes’. This could, at least in part, be attributable to the low SES of the population studied. However, the bilingual groups had a significantly greater proportion of phonological errors than the monolingual controls. For example /θənomətʌ/ was frequently accepted as a correct representation of ‘thermometer’, and /aɪbləʊ/ as a correct representation of ‘eyebrow’. This suggests that the bilingual groups more readily accepted inaccurate phonological representations for familiar vocabulary. This finding is consistent with those of Windsor and Kohnert (2004) who propose that deficits in bilingual L2 development are attributable to less elaborate lexical representations in English.

As Figure 1 illustrates, each group had differences between the number of semantic and phonological errors, with the monolingual profile being very different to that of both bilingual groups. Within-group comparison revealed a significant difference for the monolingual group. Although both bilingual groups demonstrated a similar profile, the difference between errors types reached significance only for the Vietnamese group.

Further analysis examined whether the type of discrimination required (i.e., voice, place, or manner) affected performance on phonological foils in the picture name judgment task. Figure 2 demonstrates that the groups did not differ significantly on manner discrimination. Interestingly however, the bilingual groups made significantly more place and voice discrimination errors than the monolingual group. It is possible that phonetic differences between L1 and L2 affected the ability of bilinguals to discriminate fine differences in place and voicing of sounds in words. Despite their vastly different consonant repertoires however, both Vietnamese and Samoan have multiple sounds discriminated from others only by voice or place. This suggests another reason for the bilingual pattern of results.

Table 3 indicates that performance on the picture name judgment task was also affected by the number of syllables in words being discriminated. While the monolingual group made fewer errors overall, all groups made fewer errors on mono-syllabic words than on bisyllabic and multisyllabic words. There was no significant difference between the number of errors on two syllable words versus words with three-four syllables. This may indicate that bilingual students more easily develop complete, intact phonological and semantic representations for words containing one syllable.

## 5.2

### **Lexical tasks**

On all other tasks measuring lexical understanding and use, findings were similar. Scores for the Hundred Pictures Naming test (Fisher & Glenister, 1992), expressive vocabulary, receptive word classes and expressive word classes tasks indicated that L1E performed significantly better than both bilingual groups. Literature suggests that students in the study could have had sufficient exposure to English to perform at the same level as monolinguals in academic language tasks (Collier, 1987; Cummins, 1984; Hakuta et al, 2000, Kohnert et al., 1999; Kohnert & Bates, 2002; Ramírez, 1992; Windsor & Kohnert, 2004). The results did not support this suggestion. Even in the Hundred Pictures Naming test, a task evaluating lexical access to common objects, a highly significant difference was noted for both bilingual groups.

It was also interesting that there was no difference in performance between the L1V and L1S scores on any lexical task. Despite contrasting cultural backgrounds and first language roots, there was no difference in the way these groups performed on lexical tasks in their second language. One possible cultural difference was observed in lexical efficiency. While there was no difference between the time taken to complete the Hundred Pictures Naming test for the L1E and L1S groups, the L1V group was significantly slower than the monolingual group in completing the task. Further investigation found that there was no significant correlation between time taken to complete this task and total score for the L1E and L1S students. However, there was a significant negative correlation for the bilingual Vietnamese group. Better results were associated with longer response times. This has not been previously reported in the literature.

## 5.3

### **Lexical Comprehension versus Production**

Two comparisons of lexical comprehension and production were completed. The first examined scores on the receptive picture name judgment and expressive vocabulary tasks.

While all groups performed better on the receptive picture name judgment task than on the expressive vocabulary task, the monolingual controls performed significantly better than LIV and LIS on both tasks. Again, performance by the two bilingual groups did not differ, although the gap between comprehension and production scores was significant for the Samoan bilinguals but not the Vietnamese group.

Kohnert and Bates' (2002) study used similar tasks to compare lexical comprehension and production in primary aged students. They found that L2 dominance was present in comprehension for 11 – 13-year-olds with approximately six years of L2 exposure. That is, L2 comprehension had developed to a point where it was stronger than L1 comprehension. While the current study did not measure language dominance, it did show that comprehension was stronger than production for both bilingual groups. Given 6 years of English exposure, this could be evidence of L2 dominance in comprehension. It is troubling that although these students may have better comprehension in English than in their L1, comprehension in English remains significantly below that of monolingual peers. That is, dominance in L2 (English) does not equate with adequate language for academic success. The importance of this finding demands additional research.

The differences between comprehension and production of L2 may have been due to task difficulty. Therefore, a second analysis compared comprehension and production scores on the Word Classes task of the CELF-4. While all groups performed better receptively than expressively, the monolingual group performed significantly better on both tasks than LIV and LIS students. There was no difference between the bilingual groups.

Figure 3 highlights the similarities in scores across groups even when different measures of comprehension and production are used. This result is interesting because no previous research has compared the lexical skills of multiple language groups. Although differences between monolingual and bilingual students are reported, it has been difficult to know to what extent difficulties are due to characteristics of the first language influencing the second as opposed to the state of being monolingual versus bilingual. The two bilingual groups in this study were from very different language backgrounds. Their differences to the monolingual group, as well as their similarities to each other, could not be attributed to language or cultural factors.

## 5.4

### **Nonword tasks**

The control group had an obvious advantage in completing lexical tasks, given their exposure to English since birth, and use of it as their first and only language. Inclusion of nonword tasks in the assessment battery allowed information about lexical processing skills to be obtained without this bias. Analysis of scores on both auditory discrimination of nonwords and auditory lexical decision tasks suggested no significant difference between groups. This contrasts with Windsor and Kohnert (2004). They reported that while monolingual and bilingual groups were equally able to identify real words on an auditory lexical decision task, English-only-speaking children were more accurate than bilingual children in rejecting nonword stimuli.

It was somewhat surprising that the high proportion of phonological errors on the picture name judgment task could not be explained by linguistic differences in

auditory discrimination or lexical decision making. Bilingual students were able to discriminate fine differences in words, and identify real versus nonsense words as well as their monolingual peers. However, they had difficulty rejecting incorrect phonological representations when presented with a picture stimulus (e.g., deciding whether ‘thernometer’ was a correct label when looking at a thermometer). One possibility is that bilingual children may have difficulty rejecting phonological foils due to storage of impoverished phonological representations for words, particularly in the presence of picture stimuli (Kohnert & Bates, 2002).

There is an alternative explanation. Bilingual children, particularly those whose English is learned in a classroom situation, may be willing to accept phonological foils because they seek meaning in every utterance. In the picture name judgment task, they focus on matching a spoken word and a picture as opposed to analyzing the phonological token more closely. That is, in the same way that parents do not “hear” their young children’s speech errors, bilingual speakers may not “hear” speech errors in a picture-name judgment task. Further studies should investigate these two possibilities.

There was no difference between the two bilingual groups or between L1E and L1V on the nonword repetition task. However, the monolingual students did perform significantly better than their L1S peers. Possibly the L1E group were better due to a greater familiarity with the phonology of the words presented in this task. The nonwords were more “word like” for English (Dollaghan & Campbell, 1998) than Samoan, which has a markedly different syllable structure and phoneme repertoire.

## 6 Conclusion

This study investigated English knowledge and use in two bilingual groups from culturally and linguistically diverse backgrounds. Their lexical skills in the sixth year of education in an English speaking school were compared. Surprisingly, there were no differences in the way these groups performed on lexical tasks in their second language. They understood and used the lexicon in similar ways and demonstrated similar error patterns. Their performance on nonword tasks was also comparable. This suggests that the linguistic influences of L1 on second language learning were complete following six years of exposure to L2.

The students in the current study were from a low socioeconomic area with a high proportion of bilingualism. The literature indicates that students within this population would be disadvantaged in language learning (Locke et al., 2002; Whitehurst, 1997; Whitehurst & Fischel, 2000). Disadvantage was apparent even in the monolingual group, whose mean scores on standardized tests were at the lower end of the normal range. Factors beyond SES were evident in the bilingual groups however, with standard scores significantly lower than monolingual controls.

On both receptive and expressive lexical tasks, not only did task scores differ, but also the type of errors made. The proportion of semantic and phonological errors made by the bilingual groups was opposite to the L1E group. These differences cannot be attributed to cultural or linguistic differences in L1 as the two very different language groups were compared within a single geographic area. Instead, bilingualism was the contributing factor to reduced scores in English tests. Despite considerable exposure to



L2, and likely L2 dominance (particularly in lexical comprehension) year six students in the population studied remained at a disadvantage in the language of education and power within that community. While these gaps in language knowledge should not be interpreted as evidence of pathology, they do indicate incomplete acquisition of aspects of L2, particularly those related to development of lexical representations (Kohnert & Bates, 2002; Nicoladis & Genesee, 1997). If differences persisted, these students would be disadvantaged in their ability to access the language of higher education. This in turn would influence the quality of education accessible in comparison to monolingual peers (Brutt-Griffler & Varghese, 2004).

These results have implications for both speech pathologists and educators working with bilingual populations. In particular, when bilingual students have sufficient schooling in English for it to be their dominant language, it should not be assumed that the standard of L2 will be adequate for academic success. Consequently, measurement of skills using standardized language assessments (with monolingual norms) remains inappropriate, even following six years of formal schooling in L2. In addition, incomplete acquisition of L2 has implications for teaching methods. Bilingual students may continue to require additional language support through upper primary and secondary schooling in order to access curriculum content and contribute at the level of monolingual peers.

The reason *why* bilingual students' L2 skills remain below those of monolingual peers requires further investigation. Toribio (2004) suggests the bilingual speaker uses a reduced lexicon and simplifies or restructures syntax in both languages as a result of language economy, reducing "processing costs while enjoying the richness of bilingualism" (p. 52). However, semantic and phonological error patterns in the current study suggest that the lexicon of the first language may influence second language lexical organization, and therefore the way students access word meanings and select vocabulary for expressing themselves.

It is clearly inappropriate to compare the lexical skills of bilingual students to monolingual peers in the classroom setting. Norms obtained from monolingual populations cannot be easily applied students learning English as a second language. However, lexical comparison of bilingual groups from different language backgrounds does appear valid following six years of English exposure. Further investigation should consider grouping populations from diverse language backgrounds to develop bilingual norms for L2 language skills. The ability to distinguish between "normal" bilingual language development and bilingual students with language disorders or delays would benefit both educators and health professionals. This in turn could improve appropriate and timely referral of students with identified language difficulties to appropriate intervention and support services.

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## Appendix 1

### Order of tasks presented

1. Expressive Vocabulary (CELF-4)
2. Word Classes (CELF-4)
3. Hundred Pictures Naming test
4. Receptive Picture Name Judgment
5. Auditory Lexical Decision
6. Non-Word Repetition
7. Auditory Discrimination of Nonwords

## Appendix 2

### Receptive picture name judgment: Task items

Picture shown...	Question...	Picture shown...	Question...
1. snowman	Is this a snowman?	31. peacock	Is this a peacock?
2. jacket	Is this a jumper?	32. volcano	Is this a volcemo?
3. neck	Is this a neck?	33. slide	Is this a slide?
4. peach	Is this a plum?	34. yacht	Is this a yod?
5. ostrich	Is this an ostrif?	35. vase	Is this a jug?
6. dice	Is this a daiz?	36. steeple	Is this a steeble?
7. pumpkin	Is this a pumpkin?	37. necklace	Is this a necklace?
8. drawer	Is this a shelf?	38. whale	Is this a shark?
9. asparagus	Is this asparagus ?	39. igloo	Is this a teepee?
10. lemon	Is this a grapefruit?	40. crayon	Is this a crayon?
11. arm	Is this an arn?	41. jelly	Is this jewi?
12. waterfall	Is this a waterfall?	42. giraffe	Is this a gijaffe?
13. rhinoceros	Is this a hippopotamus?	43. mug	Is this a mug?
14. helicopter	Is this a helicopter?	44. parachute	Is this a paraJuke?
15. jigsaw	Is this a jigsaw?	45. broccoli	Is this broccoli?
16. screwdriver	Is this a spanner?	46. swan	Is this a goose?
17. finger	Is this a finger?	47. church	Is this a church?
18. ladder	Is this stairs?	48. pyramid	Is this a pyrabid?
19. tiger	Is this a tidΛ?	49. needle	Is this a pin?
20. bowl	Is this a bowl?	50. worm	Is this a worm?
21. accordion	Is this bagpipes?	51. fountain	Is this a fountain?
22. harp	Is this a violin?	52. nail	Is this a nail?
23. wrist	Is this an ankle ?	53. brush	Is this a brutf?
24. seahorse	Is this a seahorse?	54. sword	Is this a sword?
25. ticket	Is this a ticked?	55. glove	Is this a glu3?
26. rake	Is this a broom?	56. globe	Is this a gloom?
27. thermometer	Is this a thernometer?	57. collar	Is this a sleeve?
28. hoof	Is this a paw?	58. saddle	Is this a bridle?
29. bath	Is this a bath?	59. shoulder	Is this a shoulder?
30. eyebrow	Is this an eyeblau?	60. horn	Is this an antler?

Appendix 3

Auditory discrimination of nonwords: Task items

1. naɪb - naɪb	17. dɔɪtəʊvæb - dɔɪtəʊvæb
2. nɔɪtəʊf - nɔɪtəʊv	18. dɔɪf - dɔɪf
3. vɔʊp - vɔʊb	19. tɛrvæk - tɛrvæg
4. vɔʊp - vɔʊp	20. naɪtʃɔʊvɛɪb - naɪtʃɔʊvɛɪb
5. dɔɪtəʊvæb - dɔɪtəʊvæp	21. tʃɪnɔɪtəʊb - tʃɪnɔɪtəʊb
6. tʃɪnɔɪtəʊb - tʃɪnɔɪbəʊt	22. tɛrvæk - tɛrvæk
7. tʃɔʊvæg - tʃɔʊvæg	23. tɛɪvɔɪtʃaɪg - tɛɪvɔɪtʃaɪk
8. vɛɪtətʃaɪdɔɪp - vɛɪtətʃaɪdɔɪb	24. vætʃaɪp - vætʃaɪp
9. nɔɪtəʊf - nɔɪtəʊf	25. tɛɪvɔɪtʃaɪg - tɛɪvɔɪtʃaɪg
10. naɪtʃɔʊvɛɪb - naɪtʃɔʊbɛɪv	26. vætʃaɪp - væpɑɪtʃ
11. dævɔʊnɔɪtʃɪg - dævɔʊnɔɪtʃɪg	27. dævɔʊnɔɪtʃɪg - dævɔʊnɔɪgɪtʃ
12. naɪtʃɔɪtaʊvʊb - naɪtʃɔɪtaʊvʊb	28. naɪb - naɪp
13. tʃɔʊvæg - tʃɔʊgæv	29. naɪtʃɔɪtaʊvʊb - naɪtʃɔɪtaʊbʊv
14. təʊdʒ - dʒəʊt	30. tævətʃɪnaɪg - tævətʃɪnaɪk
15. tævətʃɪnaɪg - tævətʃɪnaɪg	31. vɛɪtətʃaɪdɔɪp - vɛɪtətʃaɪdɔɪp
16. dɔɪf - fɔɪd	32. təʊdʒ - təʊdʒ

# Appendix 2

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## Errata

### Chapter 2

p.363: In the first paragraph, the second sentence summarising the Hemsley, Holm and Dodd paper (2006) should read, ‘In particular, scores on the expressive *word classes task* were *below the average range of the monolingual normative sample*’.

p.368: In the fifth paragraph, the description of translation equivalents should read, ‘TE: items identified or labelled *correctly* in both L1 and L2’.

### Chapter 4

p.114: The acknowledgements should read, ‘this research *was supported by* the Department of Education and Training: Queensland...’.

### Appendix 1

p.464: The caption for Table 3 should read, ‘The *effect* of syllable length on picture name judgment performance’.

p.471: The second sentence of the final paragraph should read, ‘Norms obtained from monolingual populations cannot be easily applied *to* students learning English as a second language’.